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Report of

BLISTER RUST CONTROL IN THE NORTH CENTRAL REGION, 1934

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Summary Report Blister Rust Control Activities, North Central States Region

Calendar Year 1934

Introduction

The expanded blister rust control program started in the latter half of 1933 was continued with still greater expansion during the calendar year 1934. This increase in the work was made possible by the various emergency relief organizations operating in the region and its effectiveness was due to the large amount of pre-eradication surveys and planning of the work brought about during the winter of 1933 and 1934.

During the eradication season of 1934, a total of 40,231,329 Ribes bushes were removed from 500,220 acres of land in giving protection to 148,557 acres of white pine and 5,259 acres of white pine planting sites in this region. From 1918 to 1933 inclusive 13,278,838 Ribes were removed from 235,704 acres of land in giving protection to 88,977 acres of white pine and white pine planting sites. The control accomplishments of the 1934 season therefore were approximately double those previous to 1934. The above figures are for both initial and second eradication. However, nearly all of the work was initial eradication.

Agencies Performing Control Work

In 1934, the blister rust control program was carried on in each state through the various agencies as shown in Table 1.

The character of work performed under each of these organizations is as follows:

State Contributions

This item refers to the time and effort contributed by the various state cooperators, contributed office space, stenographic services, supplies, storage, etc.

State Allotment

This includes actual cash contributed toward the work either by means of an allotment or direct appropriation. In Michigan, there was a direct appropriation. In Wisconsin and Minnesota, funds were allotted from other state appropriations for blister rust control.

These funds were spent in some cases for the employment of labor and in others for the employment of temporary field supervisors, or for traveling expenses of agents.

Private Cooperation

This includes time or money furnished by private owners under the supervision of a blister rust foreman for the protection of their pine stands or nurseries.

Regular Funds

From January 1 to June 30, 1934, the Regional Director was on regular appropriation, salary only.

PR-NRA

These funds were used to pay the salaries and expenses of the blister rust supervisory forces as well as for the employment of labor in local control. In Wisconsin, Michigan and Illinois only a very small portion of these funds was spent in the hiring of unskilled labor. Instead it was used primarily for the employment of foremen to supervise control operations performed under the FERA and other relief programs. In Minnesota, Iowa, Indiana and Ohio it was used not only for the above purpose but also for the hiring of unskilled laborers.

FERA

FERA funds were used for labor on various projects in Michigan, Wisconsin, Minnesota and Illinois. In Michigan and in Wisconsin FERA men were used in cultivated black currant survey and eradication and in local control. In Minnesota there was a small FERA project on Ribes survey in Duluth. In Illinois, FERA men were used on local control in Winnebago County. In general, the use of men on relief in blister rust control work proved very successful. Its success was, of course, primarily dependent upon the character of the foremen employed on NRA funds supervising our work. In all cases excellent cooperation was received from the county relief authorities in making available this type of labor for control work.

Forest Crop Law

Under the Forest Crop Law in Wisconsin for forest land classified as such, the county receives taxes at the rate of 10 cents per acre per year from the owner and 10 cents per year from the state. In case of such county owned lands the county receives 10 cents per acre per year from the state. These funds are for general forestry purposes on county forests and certain amounts were approved for blister rust control work. However, supervision was not available and no control work was performed on Forest Crop Law funds in 1934. Forest Crop

Law funds were used in the transportation of FERA laborers in a few instances.

CWA

Under the Civil Works Administration men were employed on blister rust control operations during December 1933 and January 1 to March 15, 1934. In the Milwaukee office one man was employed as a clerk and draftsman. In Michigan the men were employed in cultivated black currant eradication in about thirty counties and on canker pruning in Upper Michigan. In Wisconsin CWA crews were used in making pre-eradication surveys. In Iowa the men did white pine shelterbelt census work. In Illinois they were used as laborers in early spring Ribes eradication. In Ohio they were used in making pre-eradication surveys and also in dormant Ribes eradication.

Technician ECW

Three men were employed as technicians on the ECW payroll. They were used principally to give supervision to the work on Federal lands under the direction of the state leader concerned. One man each was assigned to work on Federal lands in Wisconsin, Michigan and Minnesota.

State ECW

A large program of local control and nursery sanitation was performed under the State ECW in all of the states but Illinois. This work was immediately supervised by ECW foremen in camps -- each foreman supervising approximately 25 CCC enrollees. The State ECW also was responsible for making pre-eradication surveys within the working radii of the camps. The completed Ribes eradication work was checked by an ECW checker, who also gave technical direction to the work in an assigned district usually containing three to five CCC camps. All of this control work was under the technical supervision of the state leader. This method of performing local control was highly successful.

Forest Service ECW

The same general method as described under the State ECW was in operation in the Forest Service ECW camps and was very successful.

Parks ECW

Local control work was performed under this program as described above with the exception that no checkers were authorized and the work of checking had to be done by others in the control organization. Good work was done under this program.

Table 1. - Programs Under which Blister Rust Control Work was Performed, North Central Region, 1934

Program	Mil. Office	Mich.	Wis.	Minn.	Iowa	Ill.	Ind.	Ohio	Total States
State Contribution		1	1	1	1	1	1	1	7
State Allotment		1	1	1					3
Private Cooperation		1	1	1	1	1		1	6
Regular	1								1
BR-NRA	1	1	1	1	1	1	1	1	8
FERA		1	1	1		1			4
Forest Crop Law			1						1
CWA	1	1	1		1	1		1	6
Tech-ECW	1	1	1	1					4
State ECW		1	1	1	1		1	1	6
FS-ECW	1	1	1	1					4
Parks ECW		1	1	1		1			4
Indian ECW			1	1	1				3
FS-NRA		1	1	1					3
Totals	5	11	13	11	6	6	3	5	60

Indian Service ECW

Excellent local control work under the Indian ECW program was performed in Minnesota and in Wisconsin and on a small planting in Iowa. In Minnesota the supervision as well as labor was paid from Indian Service ECW funds under the general supervision of the blister rust control organization. In Wisconsin this arrangement was in effect on the Menominee Indian Reservation but on the Lac Courte Oreilles and Lac du Flambeau Reservations the Indian ECW furnished the labor and supervision was carried by our Nira funds. This arrangement was occasioned by the fact that mixed ownership of land occurred on the last named Indian reservation and the work was thus on a cooperative basis.

Forest Service Nira

Nira funds for local control and nursery sanitation were furnished by the Forest Service in Michigan, Wisconsin and Minnesota. This work was also under the general technical supervision of our Division and good work was accomplished.

Organization

The work was administered under the same organization as prevailed in 1933; viz., Regional Director Milwaukee and state leaders in Michigan, Wisconsin, Minnesota, Iowa and Ohio and a temporary agent each in Illinois and Indiana handling the work during the summer.

In Table 2 is shown the number of persons employed under the several programs each month of the year. Besides a CWA clerk-draftsman in January, February and March, and a clerk working on FERA funds in November, there were four persons working full time in the Milwaukee office.

In Table 3 is shown the approximate number of persons employed throughout the region under the several programs each month of the year. During the five months period, May to September inclusive, 11,643 man months, or 86.9% of the years total, were employed. During January to March inclusive most of the men were employed on CWA funds. During the last three months of the year the majority was employed under the FERA and State ECW programs making cultivated black currant and pre-eradication surveys respectively.

Note also that the two programs, NRA and State, in which were employed most of the general supervisory staff, as well as supplying labor, employed together 10% of the man months. The ECW programs collectively employed 66% of the man months, of which the State ECW program alone paid for 37.4% of the man months. That extensive use of FERA labor was employed

Table 2. - Approximate Number of Persons Working on the Several Programs by Months, Blister Rust Control, Milwaukee Office, 1934.

Program	Position	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Approximate No. Man Months
Regular	Field Supervisor	1	1	1	1	1	1							6
N.R.A.	Field Supervisor							1	1	1	1	1	1	6
	Asst.Field Super.	1	1	1	1	1	1	1	1	1	1	1	1	12
	Clerk	1	1	1	1	1	1	1	1	1	1	1	1	12
	Sub-Total	2	2	2	2	2	2	3	3	3	3	3	3	30
E.C.W.-FS	Clerk	1	1	1	1	1	1	1	1	1	1	1	1	12
C.W.A.	Clerk	1	1	1										3
F.E.R.A.	Clerk											1		1
All Programs	Supervisory	2	2	2	2	2	2	2	2	2	2	2	2	24
	Clerks	3	3	3	2	2	2	2	2	2	2	3	2	28
	Totals	5	5	5	4	4	4	4	4	4	4	5	4	52

Table 3. - Approximate Number of Men Engaged in Blister Rust Control Activities Under Various Programs, North Central Region, 1934

Month	Regular Approp.	NRA (BRC)	State Funds	CWA	FERA	NRA FS	ECW Tech.	ECW State	ECW FS	ECW IS	ECW Parks	Total No. Men
January	1	26	1	109			3	46	1			187
February	1	26	1	111			3	45	1			188
March	1	25	1	117			3	46	1			194
April	1	28	1				3	31	1		15	80
May	1	146	16		61	16	3	637	327	80	27	1314
June	1	199	11		281	41	3	871	433	188	108	2136
July		195	42		545	42	3	911	521	344	204	2807
August		227	55		685		3	1061	371	358	168	2928
September		124	21		743		3	991	268	229	79	2458
October		84	3		322		3	303	10	1	43	769
November		58	2		92		3	36	3	1		195
December		41	1		59		3	34	2			140
Total Man No.	6	1179	155	337	2788	99	35	5012	1939	1201	644	13396
Percent of Total	Trace	8.8%	1.2%	2.5%	20.8%	0.7%	0.3%	37.4%	14.5%	9.0%	4.8%	100.0%

is indicated by the fact that 20.8% of the total man months was employed under that program.

In Table 4 there is shown the segregation of man months into supervision and labor. Note that 53.1% of NRA man months was devoted to supervision. Men employed under this program gave general supervision to the entire program. Note that about 6% of the man months under the different ECW programs was supervision and 94% labor. Practically the entire FERA man months were labor.

Men working on the various programs in the different states were paid salaries and wages of quite a wide range for work of the same responsibility. In general, supervisory positions under the ECW were paid a higher rate than positions carrying equal responsibilities under the NRA program. The range of wages paid for different positions is shown in Table 5. Note that under the State ECW programs $1.00 per man day for CCC enrollees was used in Michigan, Illinois and Indiana, while the rate of $3.00 per man day for CCC enrollees was used in Wisconsin, Minnesota, Iowa and Ohio. These rates are the same as those used in other ECW projects in the state to which they refer. Note that a rate of $3.00 per CCC man day was used in all Forest Service activities and that $2.10 per day was used in the Indian Service ECW program. In the case of the Indian Service, each man was paid $1.50 per day with a 60 cents allowance for sustenance since the Indians did not live in camps.

Spread of the Rust

During the course of the field work many new pine infection centers, indicating greater intensification, were found in the region in counties from which the rust had previously been reported. In several of these counties, notably in Wisconsin, Minnesota and Upper Michigan, pine infection was found quite generally distributed in counties from which only one or a few pine infection centers had previously been known.

In addition, pine infection was reported from several counties in states in this region in which pine infection was not known previously. In Becker County, Minnesota, near the western limit of white pine, an area of approximately 20 acres was found on which infection was quite heavy and well distributed. A study of this area showed that white pine averaged 300 to 500 per acre, ranging in height from 1' to 15'. Of 620 trees examined, 136, or 22%, were found infected -- 59 of these trees had been killed by blister rust or 43% of the infected pines were already dead. Infection here was apparently chargeable to R. cynosbati, R. americanum, and R. triste scattered through the stand at a rate of approximately 400 per acre. Infection apparently originated in 1923.

In Wisconsin, pine infection was found in the following six counties reported for the first time; viz., Chippewa, Jackson, Marathon, Oneida, Adams and Lincoln.

Table 4. - Approximate Number of Man Months of Supervision and Labor by Programs, North Central Region, Including the Milwaukee Office, 1934

Program	Number of Man Months: Supervision	Labor	Total	% of Total Man Months: Supervision	Labor
NRA (BPC)	*629	556	1185	53.1	46.9
State Funds	64	91	155	41.3	58.7
CWA	145	192	337	43.0	57.0
FERA	1	2787	2788	Trace	100.0
NRA (FS)	14	85	99	14.1	85.9
ECW (Tech.)	36	0	36	100.0	0
ECW (State)	388	4725	5113	7.6	92.4
ECW (FS)	126	1813	1939	6.5	93.5
ECW (IS)	81	1120	1201	6.7	93.3
ECW (Parks)	24	519	543	4.4	95.6
Total	1508	11888	13396	11.3	88.7

* Includes 6 man months of Field Supervisor's time paid from Regular Appropriation.

Table 5. - Range of Gross Wages Paid [illegible] Classes of Workers, Blister Rust Control, North Central Region, 193[illegible]

State	Position	NRA	FERA (Private)	Coop. (Private)	CWA (Private)	Tech. E.C.W. (Program)	State E.C.W.	Parks E.C.W.	F.S. E.C.W.	I.S. E.C.W.	State Funds
Michigan	District Agents	$2000 to 2200 Y									
	Asst. Dist. Agents	130 M to 135 M									
	ECW Checkers					[illegible]	$150 M		$167 M		
	Foremen	110 M to 120 M					120 to 140 M	$140 M	150 M		$120 M
	Strawbosses	55¢ to 60¢ H			$1.[illegible]						
	Laborers	50¢ H	$.35 to .45 H	$.30 H	[illegible]		1.00 D	1.00 D	3.00 D		
Wisconsin	State Leaders	$2400 Y									
	Dist. Agents	1800 Y									
	Asst. Dist. Agents	135 M									
	ECW Checkers					[illegible]	$167 M		$167 M	$150 to 175 M 150 M	
	Foremen	120 to 135 M			$1.[illegible]		140 M		150 M	135 M	$120 M
	Strawbosses	60¢ H	.50 to .62 H							90 M	
	Laborers	50¢ H	.30 to .55 H	.30 H	.65 [illegible]		3.00 D		3.00 D	2.10 D	2.40 D
Minnesota	State Leaders	$2000 Y									
	Dist. Agents	1800 Y									
	Asst. Dist. Agents	135 M									
	ECW Checkers					[illegible]	$150 M		$167 M		
	Foremen	120 to 135 M					120 to 140 M	$120 to 140 M	150 M	$150 M	$120 M
	Strawbosses	60¢ H								90 M	
	Laborers	50¢ H	.50 H	.30 H			3.00 D	3.00 D	3.00 D	2.10 D	
Iowa	State Leaders	$2400 Y									
	Foremen	120 M			$1.[illegible]			$140 M		$140 M	
	Laborers	50¢ H		.30 H	[illegible]			3.00 D		2.10 D	
Illinois	State Leaders	$ 125 M									
	Foremen							$140 M			
	Laborers		.45 to .60 H	.30 H	[illegible]			1.00 D			
Indiana	State Leader	$ 125 M									
	Foremen						$140 to 167 M	$140 to 167 M			
	Laborers	50¢ H					1.00 D	1.00 D			
Ohio	State Leader	$2000 Y									
	Foremen	110 to 120 M			$1.20 [illegible]		$150 M				
	Laborers	90 M		.30 H			3.00 D				

H - Hourly rate of Pay
D - Daily " " "
M - Monthly " " "
Y - Yearly " " "

In Upper Michigan, pine infection was found for the first time in Ontonagon County. In Lower Michigan, pine infection was found for the first time in five counties; viz., Leelanau, Emmet, Otsego, Alcona and Sanilac. Previous to this year pine infection in Lower Michigan had been reported from only six counties, within these six counties at only one or two places with one or two cankers per place. Pine infection in Lower Michigan was found during the fall scouting principally by following up leads of infection on cultivated black currants. The largest infection in Lower Michigan was at Leland at Leelanau County. A detailed study of this infection this fall showed that 475 cankers were found on 92 infected trees out of a total of 291 examined. Of the pine examined, 32% were found infected. The infection resulted from approximately 200 neglected R. nigrum bushes, growing in close proximity to white pines, varying in size from 1' to 50'. Of the total of 475 cankers, 453 or approximately 95% were first symptoms. Of all cankers found 196 were on 1933 growth. The oldest canker found was on 1923 growth. Apparently there has been a very rapid intensification of the rust on pines at this point. The infection has not spread far as yet, occupying less than an acre. The neglected R. nigrum bushes were removed in the summer of 1934.

In Iowa, pine infection was reported in July from Dubuque County in northeastern Iowa in a native stand of white pine known as Pine Hollow. Three cankers on 1931 growth were found on one small white pine tree and positively identified as such by the Plant Pathologist at Ames, Iowa. This infection was apparently caused from R. cynosbati associated with the white pines. The infection was found in connection with Ribes eradication at this point.

In Ohio, several Ribes infection centers were reported from the northeastern part of the state and a new pine infection was reported from Geauga County, Ohio, the northeastern part of the state. Here eight infected pines were found, apparently caused from black currant bushes.

It is evident from the large number of pine infection centers found and the high proportion of young cankers that blister rust is definitely increasing in spread and severity each year in this region.

Acreage of White Pine

In Table 6 is shown the acreage of white pine in the North Central Region by states, divided into first priority, second priority pine and scattered pine. The priority rating refers to pine for forestry purposes and applies only to such a purpose. The definitions of these three classes are as follows: The minimum requirements for the first priority white pine stands are those requirements set up previously and are as follows:

1' to 6' high	---	200 pines per acre
7' to 15' high	---	100 pines per acre
Over 15' high	---	50 pines per acre

Table 6. - Acreage of White Pine in North Central Region, Estimated as of December 31, 1934

State	(1) 1st Priority Pine	(2) 2nd Priority Pine	Sub-Total Pine to Protect	Scattered Pine	Grand Total
Michigan	275,832	300,000 (Est.)	575,832	451,614	1,027,446
Wisconsin	311,710	274,250	585,960	720,000	1,305,960
Minnesota	57,239	299,197	356,436	636,481	[illegible]
Iowa	4,000*		4,000		[illegible]
Illinois	1,200		1,200	500	1,700
Indiana	630		630	370	1,000
Ohio	3,151		3,151	1,513	4,664
TOTALS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Includes approximately 8,000 white pine shelterbelts estimated to average 1/4 acre of white pine each.

(1) Meeting Minimum Forestry Requirements: 200 per acre 6' tall or less; 100 per acre 7' to 15' tall, 50 per acre over 15' tall.
Areas to consist of 20 acres or more each. For aesthetic purposes these forestry requirements do not apply.

(2) Meeting 1/4 requirements of 1st priority pine. For Forestry purposes 50 per acre 6' tall or less;
25 per acre 7' to 15' tall;
12 per acre over 15' tall.
20 acres or more in extent.
For aesthetic purposes these requirements do not apply. Pines falling in 1st or 2nd priority classes are deemed worthy of protection by state and other forestry interests.

The minimum requirements for second priority white pine stands are approximately one-fourth of first priority stands and are as follows:

1' to 6' high --- 50 pines per acre
7' to 15' high --- 25 pines per acre
Over 15' high --- 15 pines per acre

"Scattered pine" refers to those stands of white pine which are below the minimum requirements of second priority stands.

Principles governing allowable control work around these stands are as follows: In protecting stands of the first priority class remove Ribes for the full 900' around such stands with the exception of live swamp, which will be worked 300' from the pine stand. In protecting second priority pine stand work 900' from such stands with the exception of live swamps which will not be worked at all. Ordinarily scattered pine stands will not be worked. However, if such stands can be protected entirely by the scout method without the necessity for crew work, such protection costs may be justified.

Note in Table 6 that there is approximately 1,500,000 acres of white pine in the first and second priority classes in this region.

Pre-eradication Survey

During the winter, spring and fall of 1934 pre-eradication surveys in this region were conducted under the various ECW programs and on CWA and NRA funds. This may be seen in Table 7. Approximately 246,000 acres of white pine were covered by pre-eradication surveys. These surveys consisted in mapping the pine stands and protection zone limits, dividing the area into the standard Ribes types, determining what portions required crew work and scout work and making estimates of the man days required. Prior to any Ribes eradication work a map is always constructed showing these essentials.

Local Control

Extensive accomplishments in local control during 1934 were primarily made possible through the pre-eradication surveys performed previously.

In Tables 8, 9 and 10 are shown the summaries of initial control work, second eradication and total local control performed in 1934 in the various states classified by the programs furnishing labor.

Reference is made to the per acre man days; per acre costs; and Ribes pulled per acre shown in the last three columns of each of these tables. For purposes of comparison the costs per acre

Table 7. - Acres of White Pine Covered by Pre-eradication Surveys by States and Programs, North Central Region, 1934

State	Program						
	ERA	State	CWA	State-ECW	[illegible]	[illegible]	Total
Michigan	45,256			57,646	30,273		(a) 123,185
Wisconsin	8,518	5,689	27,940	42,793	11,049	7,050	103,277
Minnesota	4,901			69	7,119	8,593	15,[illegible]
Iowa			581	357			(b) [illegible]
Ohio	(c) 3,110						3,110
TOTAL	61,455	5,689	28,521	100,865	39,839	15,648	346,415

(a) Includes 2492 acres white pire planting site.

(b) Represents 2,426 white pine shelterbelts.

(c) 2526 acres native, 584 acres planted white pine. Work done both under ERA and CWA programs.

Table 8. - Summary of [illegible] Control, by States and Programs, North Central Region, 1934.

Agency Supplying Labor	Acres Protect. W.P.	Acres Protect. W.P. P.S.	Acres Worked By Crew	Acres Worked By Scout	Acres Worked Total	Ribes Pulled By Crew	Ribes Pulled By Scout (Include cult.)	Ribes Pulled Total	Man-Days Labor	Man-Days Super.	Man-Days Total	Costs Labor	Costs Super.	Costs Supplies and Transport.	Total Costs	Per Acre Total Man-Days	Per Acre Costs	Per Acre Ribes
										MICHIGAN								
NRA	51		0	410	410	0	50	50	0	2	2	0	12.53	0	12.53	-	.03	1
FERA	6249		13972	11310	25282	2,190327	33401	[illegible]	5783	836	6619	19056.43	2806.64		21863.07	.26	.66	88
State-ECW	50073		46035	84996	131031	6,925932	18079	[illegible]	29291	1418	30709	29290.50	7833.34	1855.21	38979.05	.23	.30	53
Parks-ECW	7255		1685	14280	15965	560675	1051	[illegible]	2210	154	2364	2210.50	1013.73	30.50	3254.73	.15	.20	35
FS-ECW	8749	545	13958	8185	22143	2,849937	30	[illegible]	10267	523	10790	30800.00	3850.50	1051.12	35711.72	.49	1.61	129
State Totals	[illegible]	545	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
										WISCONSIN								
FERA	10192		17238	33189	50427	3,571395	70347	[illegible]	13035	808	13843	42096.75	4688.05	3532.54	50317.34	.27	1.00	72
State-ECW	17335	635	20697	32775	53472	4,387329	58972	[illegible]	21599	871	22470	64816.00	4442.06	2258.06	71516.12	.43	1.34	83
State Parks	229		765	64	829	62464	100	[illegible]	207	22	229	496.80	124.50	49.23	670.53	.28	.81	99
Ind.-ECW	3616		4561	4397	8958	2,717864	71395	[illegible]	10065	323	10388	21914.47	1704.17	1757.72	25376.36	1.15	2.83	311
FS-ECW	1994	3238	2793	8544	11337	974428	4104	[illegible]	3386	318	3704	10158.93	1411.16	130.15	11700.24	.32	1.03	86
FS-NRA	843		288	1389	1677	221789	1987	[illegible]	276	25	301	828.00	143.66	-	971.66	.18	.58	135
State Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
										MINNESOTA								
Private Coop.	48		37	241	278	7798	266	[illegible]	29	4	33	72.80	20.00	6.15	98.95	.12	.36	29
NRA	11407		22493	12685	35178	3,850494	234582	[illegible]	7301	491	7792	29322.81	2897.41	1981.13	34201.35	.22	.97	116
FERA	5		5	5	10	13642	-	[illegible]	40	-	40	159.98	-	-	159.98	4.00	15.99	1364
State-ECW	2381		2901	2516	5417	1,305616	20018	[illegible]	4170	256	4426	11593.50	1471.02	249.85	13314.37	.82	2.45	245
Parks-ECW	2452		3782	1124	4906	1,094924	27000	[illegible]	5153	204	5357	15460.50	1318.54	343.13	17122.17	1.09	3.49	228
Ind.-ECW	9362		2999	9810	12809	4,482971	195	[illegible]	6978	195	7173	15803.27	1007.54	2623.45	19434.36	.55	1.52	350
FS-ECW	2829		3370	3553	6923	1,408034	-	[illegible]	5984	421	6405	17952.00	1939.03	996.10	20887.13	.93	3.02	203
FS-NRA	1870		536	2994	3530	238067	-	[illegible]	1137	112	1249	4558.79	820.90	861.78	6241.47	.35	1.77	67
State Totals	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
										IOWA								
NRA	243		2492	59666	62158	190303	35108	[illegible]	509	398	907	1914.25	1682.39	1416.63	5013.27	.14	.08	36
State-ECW	114	100	1068	-	1068	295435	-	[illegible]	2968	79	3047	8905.50	647.35	557.05	10109.90	2.85	9.47	277
FS.-ECW	10		206	-	206	2980	-	[illegible]	51	7	58	106.60	34.00	3.30	143.90	.28	.70	14
State Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
										ILLINOIS								
Private	10		101	-	101	1850	-	[illegible]	8	-	8	19.20	-	-	19.20	.08	.19	18
CWA	10	60	30	200	230	2400	-	[illegible]	13	4	17	52.00	25.00	1.75	78.75	.07	.34	10
NRA	20		-	180	180	-	-	-	No charges (Pre-survey served as eradication)									10
FERA	65	522	596	410	1006	150100	-	150100	301	54	355	1070.96	337.50	24.77	1433.23	.35	1.42	149
Parks-ECW	87	135	820	230	1050	172974	-	[illegible]	641	46	687	641.00	287.50	14.61	943.11	.65	.90	165
State Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	104	1067	[illegible]	650.00	41.13	[illegible]	[illegible]	.95	[illegible]
										INDIANA								
State-ECW	154	5	1423	126	1549	15030	-	[illegible]	490	35	525	490.50	133.65	53.11	677.26	.34	.44	10
Parks-ECW	71	-	415	34	449	9012	-	9012	142	13	155	142.00	40.20	21.25	203.45	.34	.45	20
NRA	40	11	121	111	232	6508	-	6508	60	10	70	170.00	62.05		232.05	.30	1.00	28
State Totals	[illegible]	[illegible]	1909	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.50	[illegible]
										OHIO								
NRA	741		1688	7966	9654	85778	11805	[illegible]	312	105	417	1047.89	754.20	104.04	1906.13	.04	.20	10
State-ECW	813		1501	1311	2812	104229	2074	[illegible]	1960	157	2117	5880.00	878.01	75.00	6833.01	.75	2.43	38
CWA	12		466	-	466	1415	-	1415	31	2	33	214.37	-	29.40	243.77	.07	.52	3
State Totals	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2567	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.69	[illegible]
Region Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	144200	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*The [illegible] acres of white pine protected were in 776 white pine shelterbelts.
11,050 Ribes [illegible] of the total of 32,198 bushes pulled by Scout were cultivated bushes.

Table 6. - Summary of [illegible] Activities and Progress, North Central States Region, 1934.

Agency Supplying Labor	Acres Prot. W.P.	Acres Prot. W.P. P.S.	Acres Worked By Crew	Acres Worked By Scout	Acres Worked Total	Ribes Pulled By Crew	Ribes Pulled By Scout	[illegible]	Man-Days Labor	Man-Days Supervision	Man-Days Total	Costs Labor	Costs Supervision	Costs Supplies and Transp.	Total Costs	Per Acre Man-Days	Per Acre Costs	Per Acre Ribes
									MICHIGAN									
State-ECW	1025		2657	312	2969	94,023	[illegible]	[illegible]	749	32	781	749.00	175.44	46.70	971.14	.26	0.33	32
Parks-ECW	1272		417	2857	3274	28,232	450	[illegible]	269	23	292	269.00	158.62		427.62	.09	.13	9
FS-ECW	100		179	0	179	16,346	[illegible]	[illegible]	123	13	136	369.00	92.16	37.01	498.17	.76	2.75	91
Total	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
									WISCONSIN									
FERA	2247		3517	5581	8898	817,712	[illegible]	[illegible]	2794	206	3000	9704.89	1121.10	733.28	11559.27	.44	1.30	92
State-ECW	756	8	72	1366	1438	308	[illegible]	[illegible]	93	1	94	279.00	4.36	2.04	286.40	.06	.20	2
State Parks	148		644	23	667	36,500	[illegible]	[illegible]	214	17	231	591.89	84.00	77.25	753.14	.35	1.13	55
Ind.-ECW	2190		487	5645	6132	186,501	[illegible]	[illegible]	1010	64	1074	1725.45	408.60	244.00	2378.05	.17	.39	32
Total	[illegible]	8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
									MINNESOTA									
NRA	994		2679	230	2909	438,645	11,890	[illegible]	536	50	586	2152.38	263.32	77.65	2493.35	.20	.86	155
									ILLINOIS									
Private*	125		1348	-	1348	5,100	-	[illegible]	20	-	20	48.00	-	-	48.00	.01	.04	4
Parks-ECW	160		283	400	683	59,490	-	[illegible]	215	13	228	215.00	81.25	3.78	300.03	.34	.44	87
TOTAL	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Region Total	[illegible]	8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* 3rd Eradication.

Table 1[illegible] - [illegible] Ribes Control by States and Agencies Furnishing Labor
North Central Region, 193[illegible]

Agency Supplying Labor	Acres Prot. W.P.	Acres Prot. W.P. P.S.	Acres Worked By Crew	Acres Worked By Scout	Acres Worked Total	Ribes Pulled By Crew	Ribes Pulled By Scout (Includes cult.)	Man-Days Labor	Man-Days Super.	Man-Days Total	Costs Labor	Costs Super.	Costs Supplies and Transport.	Total Costs	Per Acre Total Man-Days	Per Acre Costs	Per Acre Ribes Bushes
[illegible]																	
NRA	61		0	410	410	0	50	0	2	2	0	12.53	0	12.53	.01	.03	12
FERA	6249		13972	11310	25282	2,190,327	[illegible]	[illegible]	836	[illegible]619	19056.43	2808.64	0	[illegible]863.07	.63	.86	88
State-ECW	51098		48672	85308	133980	7,019,956	[illegible]	[illegible]	1450	31490	30034.50	8000.78	1901.91	39950.19	[illegible]	[illegible]	[illegible]
Parks-ECW	8027		2102	17137	19239	589,907	[illegible]	[illegible]	177	2656	2479.50	1172.35	30.50	[illegible]	.14	.19	[illegible]
FS-ECW	8949	545	14137	8185	22322	2,866,283	[illegible]	[illegible]	586	10926	31169.00	3952.76	1083.13	36204.89	.49	1.6[illegible]	1[illegible]
Total	[illegible]	545	78[illegible]	122360	20[illegible]	1[illegible],666,4[illegible]	[illegible]	[illegible]	3001	51[illegible]	827[illegible].45	15853.06	[illegible]	10[illegible]	[illegible]	[illegible]	[illegible]
[illegible]																	
FERA	14469		20555	38770	59325	4,369,107	[illegible]	[illegible]	1014	[illegible]	51801.64	5809.15	4265.92	[illegible]1876.71	.58	1.04	75
State-ECW	19101	643	20769	34141	54910	4,387,039	[illegible]	[illegible]	872	[illegible]	65095.00	4446.43	2261.10	71802.52	.41	1.31	81
State-Parks	377		1409	87	1496	120,964	[illegible]	[illegible]	39	460	1066.69	[illegible]	116.40	[illegible]	.31	[illegible]	[illegible]
Ind.-ECW	5806		5048	100[illegible]	150[illegible]	2,904,416	5051[illegible]	[illegible]	387	[illegible]	23059.92	2112.77	2002.[illegible]	27[illegible]	.76	1.83	[illegible]
FS-ECW	1984	[illegible]	2793	8544	11337	974,428	[illegible]	[illegible]	318	3704	10158.93	1411.16	130.15	11700.24	.33	1.03	[illegible]
FS-NRA	[illegible]		288	[illegible]	1677	221,789	[illegible]	[illegible]	25	301	823.00	148.66	-	971.66	.18	.58	[illegible]
Total	[illegible]	[illegible]61	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible].18	14131.0[illegible]	[illegible]	[illegible].01	[illegible]	[illegible]	[illegible]
[illegible]																	
Priv.Coop.	[illegible]8		37	241	278	7798	[illegible]	[illegible]	4	35	72.80	20.00	6.15	98.95	.12	.56	29
NRA	12401		25172	12915	38087	4,289,138	[illegible]	[illegible]	541	8378	31475.19	3160.73	[illegible]	[illegible]594.70	.22	.90	119
FERA	5		5	5	10	13,5[illegible]	-	40	-	40	159.98	-	-	159.98	4.00	15.99	1364
State-ECW	[illegible]		2901	2516	5417	1,305,610	[illegible]	[illegible]	[illegible]	4426	11593.50	1471.02	249.85	13314.37	[illegible]	[illegible].46	245
Parks-ECW	[illegible]		3782	1124	4906	1,094,924	[illegible]	[illegible]	204	5357	15460.50	1318.54	343.13	17122.17	1.09	3.49	[illegible]
Ind.-ECW	[illegible]		2999	9810	12809	4,482,971	[illegible]	[illegible]	195	7173	15803.27	1007.64	[illegible]	19434.36	.56	1.[illegible]	[illegible]
FS-ECW	2829		3370	3553	6923	1,408,034	-	[illegible]	421	6405	17952.00	1939.03	996.10	20887.13	[illegible]	3.02	203
FS-NRA	[illegible]		536	2994	3530	[illegible]38,067	-	[illegible]	112	1249	4558.79	820.90	861.7[illegible]	6141.47	.35	1.77	67
Total	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]																	
NRA	243		2492	59666	62158	190,303	[illegible]	[illegible]	398	907	1914.25	1682.39	1416.63	5013.27	.14	.08	36
State-ECW	114	100	1068	-	1068	295,435	-	[illegible]	79	[illegible]	8905.50	647.35	557.05	10109.90	[illegible]	[illegible]	[illegible]
I.S.-ECW	10		206	-	206	2,980	-	[illegible]	7	58	106.60	34.00	3.[illegible]	143.90	[illegible]	[illegible]	14
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	484	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]																	
Private	[illegible]		1449	-	1449	7,450	-	[illegible]	-	28	67.20	-	-	67.20	.02	.05	5
CWA	10	60	30	200	230	2,400	-	[illegible]	4	17	52.00	25.00	1.75	[illegible].75	.07	.34	10
NRA	20		-	180	180	-	-	[illegible] Scouts - (Pre-survey served as eradication)									
FERA	[illegible]	522	596	410	1006	150,100		[illegible]	54	355	1070.96	337.50	24.77	1433.23	[illegible]	1.42	149
Parks-ECW	247	135	1103	630	1733	252,464		[illegible]	59	915	856.00	368.75	18.39	1243.14	.53	.72	134
Total	[illegible]	717	3178	[illegible]	[illegible]	[illegible]		[illegible]	117	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]																	
State-ECW	154	5	1423	126	1549	15,030	-	[illegible]	35	525	490.50	133.65	53.11	677.26	.34	.44	10
Parks-ECW	71	-	415	34	449	9,012	-	[illegible]	15	155	142.00	40.20	21.25	203.45	.34	.45	20
NRA	40	11	121	111	232	6,50[illegible]	-	[illegible]	10	70	170.00	62.05	-	232.05	.30	1.00	28
Total	[illegible]	16	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	74.3[illegible]	[illegible]	[illegible]	[illegible]	14
[illegible]																	
NRA	741		[illegible]	7966	[illegible]	[illegible],778	[illegible]	[illegible]	105	417	[illegible]	754.20	104.04	1906.13	.04	.20	10
State-ECW	813		1501	1311	2812	104,229	[illegible]	[illegible]	157	2117	5880.00	878.01	75.00	[illegible]	.75	[illegible]	[illegible]
CWA	12		[illegible]	-	[illegible]	[illegible]	-	[illegible]	2	33	214.37	-	29.40	243.77	.07	.52	3
Total	[illegible]		[illegible]	2277	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible].91	[illegible]	[illegible]	[illegible]
Region Totals	[illegible]557	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

should be ignored since such costs were largely dependent upon the value of CCC man days used in different states. Note thatthere is a fairly close correlation between the man days used per acre and the Ribes bushes pulled per acre. The highest number of man days per acre is shown in Iowa, largely brought up by 2.26 man days per acre to pull Ribes at the rate of 277 per acre performed under the State ECW program.

Particular attention is drawn to the evidence of good work performed under the FERA program in Wisconsin. It may be noted that over 59,000 acres were worked by men on FERA rolls requiring .28 man days per acre to pull Ribes at the rate of 75 per acre. Control work performed by the Forest Service under NRA funds was also extremely well performed when it is noted that approximately 1,700 acres were covered using .18 man days per acre in pulling 133 Ribes bushes per acre.

In Tables 11, 12 and 13 the accomplishments in local control are shown summarized for the entire region according to the agencies supplying labor, divided into initial local control, second eradication and total eradication. The total control work done in this region in 1934 resulted in the protection of 148,557 acres of white pine and 5,259 acres of white pine planting site by removing 40,231,329 Ribes from 500,220 acres at a cost of 140,420 man days of labor and 8,312 man days of supervision.

The State ECW program was responsible for covering the largest acreage, followed in turn by NRA, FERA, Forest Service ECW, Indian Service ECW, Parks ECW, Forest Service NRA, private cooperation, State Parks and CWA.

In Table 14 is shown the status of initial local control work from the time work started in 1918 until December 31, 1934.

Note that the acres of white pine to be protected, 1,527,209, is the total of the first and second priority pine classes as shown in Table 6. Approximately 14.8% of this acreage has been initially protected.

In Table 15 there is shown a statement of the amount of second eradication performed in this region to December 31, 1934. It may be noted that only 4.3% of the acreage of white pine initially protected has been given the second eradication. Our big problem in this region is still giving initial protection to white pine stands.

Nursery Sanitation

Nursery sanitation was performed around 23 nurseries in this region in 1934. Nine of these nurseries were owned by private individuals, seven by the state, one by the U. S. Indian Service and six by the U. S. Forest Service.

Table 13. - Summary of [illegible] North Central Region, by Programs, 1954.

Agency Operating Unit	Acres Protected A.P.	V.P. P.S.	Acres Worked By Crew	By Contract	Total	[illegible]	[illegible]	Man-days Labor	Super.	Total	Costs Labor	Super.	Supplies & Transport	Total Costs	Per Acre Man-days	Costs	[illegible]
BIA	17,800	13	52,794	57,015	107,[illegible]	[illegible]	[illegible]	5,[illegible]	1,[illegible]	7,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	61
FWSA	46,911	325	31,611	44,519	76,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	27,850	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	78
State-SCM	70,480	747	73,448	140,754	187,760	[illegible]	[illegible]	[illegible]	[illegible]	53,804	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	87
Forest-SCM	9,258	130	1,705	18,500	20,[illegible]	[illegible]	[illegible]	8,048	120	8,068	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	88
TV-SCM	10,377	5,750	[illegible]	58,[illegible]	60,[illegible]	[illegible]	[illegible]	16,809	1,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	102
PA-CCC	5,712		586	4,285	7,[illegible]	[illegible]	[illegible]	1,833	129	1,920	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	79
State Parks	509		568	54	582	[illegible]	[illegible]	[illegible]	[illegible]	224	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	50
Indian-SCM	12,758		7,785	15,207	22,[illegible]	[illegible]	[illegible]	[illegible]	325	17,[illegible]	[illegible]	[illegible]	[illegible]	44,[illegible]	[illegible]	[illegible]	101
Private Owners	254		136	341	477	[illegible]	[illegible]	[illegible]	8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.10	.12	20
CEA	85	11	106	400	786	[illegible]	[illegible]	[illegible]	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12
Region Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 14. - Summary of [illegible] North Central Region, by Programs, 1954.

Agency Operating Unit	A.P.	V.P. P.S.	By Crew	By Contract	Total	[illegible]	[illegible]	Labor	Super.	Total	Labor	Super.	Supplies & Transport	Total Costs	Man-days	Costs	[illegible]
SCM	944		2,590	100	2,969	[illegible]	[illegible]	136	50	185	1,108.55	255.55	77.83	1,140.56	.06	[illegible]	158
FWSA	2,147		3,213	3,051	6,996	117,71[illegible]	[illegible]	5,798	209	5,006	5,954.89	1,321.07	756.56	17,359.37	.08	1.00	50
State-SCM	1,751	8	2,702	2,590	4,587	[illegible]	[illegible]	844	58	675	1,086.00	179.50	49.74	1,335.30	.08	.19	28
State Parks	190		566	25	591	[illegible]	[illegible]	214	27	231	321.00	56.50	77.83	385.14	.20	.13	66
Indian-SCM	2,180		487	5,645	6,132	[illegible]	[illegible]	1,040	54	1,078	1,775.65	400.00	144.80	[illegible]	.17	.30	55
Forest-SCM	1,260		900	8,159	8,987	[illegible]	[illegible]	666	26	620	606.26	[illegible]	5.05	[illegible]	.12	.19	22
TV-SCM	502		179	0	179	10,[illegible]	[illegible]	155	12	185	865.00	89.18	58.91	855.17	.99	.18	81
Private	137		1,348		1,341	[illegible]	[illegible]	50		50	45.00	-	-	45.00	.01	.04	6
Region Total	[illegible]		[illegible]	17,421	[illegible]	[illegible]	[illegible]	7,780	464	8,[illegible]	[illegible]	7,[illegible]	[illegible]	11,[illegible]	[illegible]	[illegible]	[illegible]

Table 15. - Summary of [illegible] North Central Region, by Programs, 1954.

Agency Operating Unit	A.P.	V.P. P.S.	By Crew	By Contract	Total	[illegible]	[illegible]	Labor	Super.	Total	Labor	Super.	Supplies & Transport	Total Costs	Man-days	Costs	[illegible]
BIA	25,486	13	40,473	61,340	110,781	4,251,[illegible]	[illegible]	5,788	1,088	7,094	24,537.02	5,281.90	1,378.65	42,888.14	.09	.40	44
FWSA	12,950	590	22,128	60,446	85,062	8,[illegible]	[illegible]	14,382	1,904	18,809	75,387.01	1,950.83	1,290.32	83,381.07	.05	1.00	80
State-SCM	76,051	760	76,354	120,402	189,756	15,12[illegible]	[illegible]	41,990	2,089	26,131	127,934.00	13,888.85	5,280.00	146,087.91	.06	.71	86
Forest-SCM	11,597	120	7,402	13,385	20,357	2,[illegible]	[illegible]	8,020	486	5,082	[illegible],630.00	1,888.98	413.27	42,101.13	.06	.80	74
TV-SCM	13,792	5,780	40,390	44,[illegible]	85,[illegible]	5,[illegible]	[illegible]	17,990	,874	22,000	30,278.00	7,000.00	5,332.18	50,799.20	.07	1.69	180
PA-CCC	2,711		834	4,983	5,807	4[illegible]	[illegible]	1,038	187	1,580	5,000.77	709.58	263.75	7,024.27	.30	1.36	69
Indian-SCM	15,176		1,874	17,802	83,106	7,[illegible]	[illegible]	18,108	589	12,080	24,566.79	3,104.61	4,094.27	47,000.47	.18	1.88	255
State Parks	893		1,409	87	1,496	180,[illegible]	[illegible]	381	59	450	1,008.89	408.50	120.48	1,633.57	.02	.06	81
Private Owners	188		1,488	241	1,727	10,[illegible]	[illegible]	37	4	51	180.00	50.00	5.18	156.15	.04	.10	9
CEA	82	50	185	200	785	[illegible]	[illegible]	44	1	60	268.77	50.00	25.15	326.60	.11	.16	5
Region Total	159,957	6,[illegible]	191,105	3[illegible]	500,[illegible]	[illegible]	[illegible]	120,000	8,[illegible]	128,[illegible]	380,288.1[illegible]	34,[illegible]	11,[illegible]	415,[illegible]	.10	[illegible]	60

Table 11. - Status of Local Control Operations, Initial Work, [illegible] to December 31, 1934, North Central Region

State	Acres White Pine to Protect	Acres Protected to Date: White Pine	Acres Protected to Date: White Pine Planting Site	Acres Worked to date	Percent White Pine Initially Protected
Michigan	579,[illegible]32	105,079	6[illegible]9	304,[illegible]84	1[illegible]
Wisconsin	585,[illegible]60	77,216	[illegible]	257,[illegible]71	13.[illegible]
Minnesota	356,436	39,4[illegible]6	0	94,945	11.1
Iowa	4,000	456	[illegible]	65,040	11.5
Illinois	1,200	452	717	[illegible]	3[illegible].7
Indiana	550	5[illegible]0	16	[illegible]	[illegible]
Ohio	3,151	2,[illegible]55	0	16,036	[illegible]
Total	1,527,2[illegible]	225,[illegible]24	7,111	705,153	[illegible]

Table 15 – Ribes Local Control, Second Eradication
1933 to December 31, 1936,
North Central Region

State	Acres White Pine To Protect*	Acres White Pine Initially Protected To Date	Acres White Pine Given 2nd Protect To Date	Acres Worked by 2nd Erad. To Date	Percent Pine Protected Twice: Total Pine	Percent Pine Protected Twice: Since Initially Protected
Michigan	575,858	102,079	1,042	7,363	0.18%	[illegible]
Wisconsin	586,403	77,218	**5,350	17,138	0.91%	6.93%
Minnesota	350,486	36,496	1,044	2,009	0.29%	2.86%
Iowa	4,000	458	0	0	0	0
Illinois	1,200	452	285	2,081	23.75%	63.05%
Indiana	630	588	0	0	0	0
Ohio	3,151	2,635	0	0	0	0
Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* Although a very small amount of 2nd eradication was performed prior to 1933, the amount was so small, and the records so incomplete that prior to 1933 the work was thrown in with initial eradication.

**Includes 8 acres of white pine planting site.

Eleven of these nurseries applied for white pine shipping permits in 1934. Five of these are private nurseries -- one is a state and five are Federal Forest Service. One state nursery (Marietta, Ohio), two private nurseries in Iowa, and one Forest Service Nursery at Cass Lake, Minn., received full pine shipping permits. Subject to inspection in the spring of 1935 white pine shipping permits may be granted for seed sown in fall of 1934 to two private nurseries in Minnesota, one private and one Federal nursery in Wisconsin and three Federal nurseries in Michigan.

Nursery sanitation was performed around 12 additional nurseries in this region who had not applied for pine shipping permits, but wanted assurance of white pine planting stock free from blister rust to be shipped within their respective states.

In Tables 16 and 17 are shown respectively a summary of nursery sanitation by states and by ownership classes.

Cultivated Black Currant Eradication

The cultivated black currant eradication program previously started in Michigan was continued in a greatly increased amount in 1934. In Minnesota the cultivated black currant eradication campaign was initiated principally to protect first Federal and State forests rather than on a county basis. It is expected that Minnesota will continue the cultivated black currant eradication campaign throughout the pine growing counties. In Wisconsin also the black currant survey was initiated using men from the FERA rolls to do the actual survey work under the supervision of a foreman in each county hired on FERA funds. The plan as adopted in Wisconsin was for a local man paid from either the FERA or the Seed and Feed Loan Administration to work an assigned township or two in which he lived and with which he was familiar. No attempt was made to remove the bushes found by the FERA laborers except to urge upon the owner the reason for their removal. It is planned to have a duly qualified Wisconsin state inspector follow up the survey work and remove the cultivated black currant eradication work in this region in 1935.

A good criterion as to the relative abundance of cultivated black currants is the ratio of the number of cultivated black currant locations found to the total number of inspections made. In Table 18 this relationship is expressed as the average number of R. nigrum locations per thousand inspections made. Note that Wisconsin shows the smallest number -- approximately six per thousand inspections. Relatively cultivated black currants were found to be nearly four times as abundant in Minnesota and over seven times as abundant in Michigan as in Wisconsin.

In Table 19 the status of cultivated black currant eradication to date in this region is shown. The only work of this nature done previous to 1934 was performed in Michigan where the campaign to rid

Table [illegible] – [illegible] Central Region, 19[illegible] (Continued)

Ownership, Class	No. of Fires Classified by Fire Size				Total	Suppression Labor	Acres Burned	[illegible]	Total Acres	Man-Days Labor	Man-Days Super.	Labor	Supervision	Other Suppr. Action	Plant Costs	Grand Total
State		1			1	State-SOS	1	[illegible]	4,293	300	18	308.00	91.00	0	10.11	408.12
Forest Service	1				1	FS-SOS	10	[illegible]	[illegible]	465	19	1,604.00	285.40	0	58.91	1,958.54
Forest Service	1		1		2	FS-SOS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	597.01	0	85.77	3,702.33
State Totals	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
Private		1		1	2	State-SOS	1	[illegible]	[illegible]	750	15	[illegible]	911.40	0	288.72	[illegible]
State			1		1	State-SOS	17	[illegible]	2,900	407	15	[illegible]	[illegible]	0	18.71	[illegible]
Indian Service			1		1	[illegible]	8	[illegible]	7,060	19	1	[illegible]	[illegible]	0	10.70	[illegible]
Forest Service	1			1	2	FS-SOS	35	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
State Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
Private		4			[illegible]	Priv-Coop	[illegible]	[illegible]	[illegible]	50	20	[illegible]	[illegible]	0	18.74	[illegible]
State	1	1			2	State-SOS	[illegible]	[illegible]	[illegible]	100	12	[illegible]	77.50	0	15.72	[illegible]
Forest Service	1				1	FS-SOS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	155.30		80.24	[illegible]
State Totals		[illegible]			[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Private		1	1		2	Priv-Coop	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]
Private	[illegible]	[illegible]			[illegible]	Priv-Coop	[illegible]	[illegible]	[illegible]	8	30	12.00	119.58	[illegible]	-	[illegible]
State		[illegible]			1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	-	-	[illegible]
Other	1				[illegible]	State-SOS	[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]	-	-	[illegible]
State Totals	[illegible]	[illegible]			[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]	[illegible]	-	[illegible]
Regional Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 17. – [illegible] North Central Region, 19[illegible] by Ownership Groups.

Ownership	No. of Fires Classified by Fire Size				Total	Acres Burned	[illegible]	Total Acres	Man-Days Labor	Man-Days Super.	Labor	Supervision	Other Suppr. Action	Plant Costs	Grand Total
Private	[illegible]	[illegible]	1	1	[illegible]	258	[illegible]	[illegible]	[illegible]	158	[illegible]	[illegible]	[illegible]	169.49	[illegible]
State	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	467	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]
Indian Service	0	[illegible]	1	0	1	8	[illegible]	7,060	[illegible]	1	[illegible]	[illegible]	-	10.70	[illegible]
Forest Service	[illegible]	1	1	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]
Regional Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 15. - Cultivated Black Currant Eradication, North Central Region 1934

State	Number Counties In Which Work Was Done	Total Inspections	R. nigrum Found Locations	R. nigrum Found Bushes	R. nigrum Destroyed Locations	R. nigrum Destroyed Bushes	Number Man-days Used	Aver. No. Bushes per Loc.	Aver. No. R. nigrum Loc. per 1000 Inspect.	Number R. nigrum Locations per Man-day
Michigan	36	130,018	6,020	57,066	6,020	57,060	7,471	9.5	44.3	0.81
Wisconsin	4	29,819	177	938	18	59	174	5.3	6.1	[illegible]
Minnesota	8	6,970	82	842	63*	527	109	10.3	12.9	0.52
Totals	60	166,906	6,286	59,613	5,101	57,646	7,854	9.4	29.2	0.86

* Estimated

Table 19. - Status Cultivated Black Currant Eradication, North Central Region, December 31, 1934

State	*Number Counties to be Worked	Number Counties Completely Worked	Number Counties Partially Worked	Cultivated Black Currants Destroyed: Previous to 1934 Locations	Previous to 1934 Bushes	1934 Locations	1934 Bushes	Total to Date Locations	Total to Date Bushes
Michigan	59	47	11	3,179	33,158	6,020	57,088	9,199	90,246
Wisconsin	40	1	3	0	0	15	59	15	59
Minnesota	20	0	[illegible]	0	0	**66	597	66	697
Total	119	48	[illegible]	3,179	33,158	6,101	57,744	9,280	91,008

* Subject to change. Certain counties may not be completely worked.

** Estimated.

the data sheet [illegible] of the collections [illegible] nearly completed.

Cost.

In Table 20 is shown a statement of costs of Milwaukee office in 1934. The entire cost is charged to "Supervision".

In Table 21 is shown a statement of total funds spent on blister rust control in the North Central Region during the calendar year 1934 in the seven states exclusive of the costs of the Milwaukee office.

From Table 21 it may be found that over $600,000 was spent on all activities in connection with blister rust control in this region. These activities include Supervision, [illegible] Agent Activities, Local Control, Nursery Sanitation, Pathological Survey, [illegible] Survey, [illegible] etc. The [illegible] contributing the greatest amount of funds was the State of [illegible] with [illegible] second.

In Table 22 there are shown total funds spent in this region in 1934, exclusive of the Milwaukee office, classified by blister rust activities. More than approximately 77% of the total funds were spent on actual field operation and 13% was spent on supervision and blister rust control agent activities. A total of 77.6% was spent in local control operations.

In Table 23 the total funds, exclusive of the Milwaukee office, are shown divided into "Wages" and "Other than wages". Note that [illegible]% of the total funds were spent on wages and 11.[illegible]% were spent on other than wages. This ratio was quite consistent in all of the seven states, ranging from [illegible]% spent on wages in Ohio to [illegible]% in Wisconsin, a difference of only [illegible] points. Note that in Ohio, Indiana and Iowa the percent of funds spent on wages is definitely lower than in the other four states. The reason for this is that in these states the projects were scattered throughout each state necessitating a relatively high cost of transportation and traveling expenses. Furthermore, there were relatively few laborers used in these states and practically the entire cost of [illegible] was [illegible]. Hence the costs of other than wages are higher in proportion to the total than in the case of states employing a large number of laborers.

In Illinois, the ratio of wages to other than wages was [illegible] relatively high because control work was largely concentrated in Winnebago, Ogle and LaSalle Counties requiring only a relatively small cost for transportation.

Reference is made to the higher percent spent on wages in Wisconsin than in Michigan. The chief reason for this difference is that in Wisconsin a charge of [illegible] per [illegible] man day was made as compared with [illegible] per [illegible] man day in Michigan. This higher rate used in Wisconsin materially increased the percent spent on wages.

Table 20 - Costs, Milwaukee Office, January 1 to December 31, 1934

Item	Regular	Nira	ECW	CWA	FERA	Total
Salaries	$1,471.22		$1,347.50	$186.00	$58.50	
Salaries FP 261		$4,083.75				
Salaries 4444		484.17				
Salaries FP 198 (Ill)		585.00				
Salaries FP 199 (Ind)		855.84				
Sub-Total, Salaries	1,471.22	6,008.76	1,347.50	186.00	58.50	9,071.98
Expenses	119.54	3,236.35	*119.52			3,475.41
Supplies	836.15	310.87				1,147.02
Totals	2,426.91	9,555.98	1,467.02	186.00	58.50	13,694.41

*Expenses of ECW Technicians, not otherwise charged to the states of Michigan, Wisconsin and Minnesota, where the technicians salaries and expenses were charged. The total ECW Technicians' costs as shown in the three states was $119.52 less than the total technicians' cost as reported from Washington.

Table 21. - Total Funds Spent on Blister Rust Control, Classified by States and Programs, North Central Region, 1934 (Exclusive of Milwaukee Office).

Program	Michigan	Wisconsin	Minnesota	Iowa	Illinois	Indiana	Ohio	Total each Program	% Total
State Cont.	4,177.13	12,668.38	2,664.79	1,955.00	157.20	210.00	1,237.40	23,069.90	3.7%
Forest Crop Law		168.00						168.00	Trace
State - E.R.A.	5,483.90	9,722.11			356.98			15,562.99	2.5%
Fed-E.R.A.	18,359.20	42,165.96	28.60		713.98			61,267.74	9.9%
Regular (U.S.)	829.90							829.90	0.1%
BR-N.R.A.	48,322.49	23,115.37	54,823.45	7,998.07	2,162.79	1,757.99	6,398.55	144,576.71	23.3%
FS-N.R.A.	1,022.10	1,036.16	6,181.97					8,240.23	1.3%
Tech-E.C.W.	5,376.13	3,043.23	1,027.19					9,446.55	1.5%
State-E.C.W.	51,923.13	96,455.60	14,318.15	10,655.90		677.26	6,934.27	180,294.31	29.0%
Parks-E.C.W.	3,604.88		16,789.55		856.00	203.45		21,453.88	3.5%
FS-E.C.W.	41,976.60	15,235.71	22,596.93					79,809.24	12.8%
IS-E.C.W.		30,192.70	28,018.09	143.90				58,356.69	8.4%
C.W.A.	10,390.65	7,401.49		3,309.70	52.00		1,948.80	23,102.64	3.7%
Fed. Drought Relief		1,521.46						1,521.46	0.3%
Total	158,756.11	242,616.17	146,448.72	24,062.57	4,298.95	2,848.70	16,519.02	621,760.24	
% of Total	30.4%	39.1%	22.9%	3.9%	0.7%	0.4%	2.6%		100.0%

Table 22. - Total Funds Spent on Blister Rust Control, Classified by States and Activities. North Central Region, 1934. (Exclusive of Milwaukee Office.)

ctivity	Michigan	Wisconsin	Minnesota	Iowa	Illinois	Indiana	Ohio	Total	% Total Spent on each Activity
upervision	13,072.65	8,105.74	10,463.61	3,916.99	90.00	210.00	2,371.91	38,230.90	6.1%
RC Agent	17,030.59	14,729.72	7,218.40	-	1,186.73	1,167.71	1,372.40	42,705.55	6.9%
ocal Control	101,713.03	175,530.01	113,953.13	15,267.07	2,822.32	1,112.76	8,982.91	419,381.23	67.5%
ura.Sanit.	6,237.94	7,378.94	1,446.72	495.60	-	-	614.52	16,173.72	2.6%
BC Erad.	30,897.41	3,378.19	1,751.22	-	-	-	-	36,026.82	5.8%
re-Erad-Surv.	16,134.07	27,846.82	5,904.80	3,915.70	41.25	123.03	2,204.14	56,170.11	9.0%
hecking	2,378.90	4,783.77	1,517.18	-	63.10	235.20	122.46	9,200.61	1.5%
ther Field Data	865.32	830.30	93.66	-	95.55	-	171.69	2,056.52	0.3%
quip-Misc.	436.20	232.68	-	467.21	-	-	678.69	1,814.78	0.3%
ll Activit-ies	188,756.11	242,816.17	142,448.72	24,062.57	4,298.95	2,848.70	16,519.02	621,760.24	
of Total	30.4%	39.1%	22.9%	3.9%	0.7%	0.4%	2.6%		100.0%

Table 23. - Total Funds Spent on Wages and Other Than Wages, Blister Rust Control, North Central Region, 1934 (Exclusive of Milwaukee Office)

State	Wages	Other Than Wages	Total	Percent Spent On Wages	Percent Spent On Other Than Wages
Michigan	$163,646.97	$25,119.14	$188,766.11	86.7%	13.3%
Wisconsin	218,868.76	23,947.41	242,816.17	90.1	9.9
Minnesota	125,901.56	16,547.16	142,448.72	88.4	11.6
Iowa	20,191.79	3,870.78	24,062.57	83.9	16.1
Illinois	3,807.37	491.58	4,298.95	88.6	11.4
Indiana	2,428.68	420.02	2,848.70	85.3	14.7
Ohio	13,779.10	2,739.92	16,519.02	83.4	16.6
Total	548,624.23	73,136.01	621,760.24	88.2	11.8

Conclusion

A gratifying amount of blister rust control work was performed in this region in 1930. Excellent cooperation was obtained from all of the various [illegible] agencies, the [illegible] and other relief agencies. Due to the work of making pre-eradication surveys we are now in a position to continue a systematic plan for blister rust control with the definite objective in mind of furnishing protection against blister rust to all white pine stands and white pine planting sites worthy of protection in the region. We have made an excellent start in this direction and it is hoped that we may be able to accomplish our purpose.

BLISTER RUST CONTROL, MICHIGAN, 1934

History of Work

Blister rust work in Michigan started in the summer of 1917 when three or four temporary men were employed scouting for the rust, particularly on imported nursery stock. Infection was first found in 1917 in Oakland County on white pines imported from France.

From 1917 to 1925, inclusive, blister rust work was restricted to a limited amount of scouting for infection on Ribes and pines during the summer months. In 1927 a permanent agent was appointed to take charge of all blister rust work in the state.

In 1928 the first cooperative control project was initiated. The cooperative control money was obtained from a town appropriation and some individual cooperation.

In 1929 the State Legislature established a definite blister rust control law and made available $20,000 for this work during each of the ensuing two years. As a result of the increased money available for the work, an additional permanent agent was appointed during the latter part of 1929 and two more permanent men were added to the force in July, 1930.

In 1931, due to personnel changes and to decreased funds, the permanent blister rust control organization was reduced to two agents.

In 1932, the largest amount of local control work to date was accomplished due principally to the use of relief labor on control projects. During 1932 a total of 17,291 acres were cleared of 1,172,149 Ribes to furnish protection to 5,364 acres of white pine.

From 1928 to 1932, inclusive, 12,613 acres of white pine were protected by removing 2,503,807 wild Ribes and 2,219 cultivated Ribes from 39,671 acres of initial work and 520 acres covered for the second time.

In 1933, regular control work using county welfare labor and men supplied by individual pine owners was performed to a limited extent in the spring. When the ECW program started in May, all efforts were directed toward performing control work through this agency. On August 12, 1933, $75,000 was made available through

the National Recovery Act. Owing to unavoidable delays only a small amount of actual control work was performed under NRA in 1933.

During 1933, principally through the emergency relief programs, a grand total of 50,253 acres were cleared of 3,543,967 Ribes bushes to protect 20,861 acres of white pine, at a cost of 9,684 man days of labor.

In the Michigan control program the guiding principle is that cultivated black currant elimination and wild Ribes eradication should go hand in hand. During the period 1929 to 1933, inclusive, cultivated black currant elimination was performed in 37 counties and completed in 20% of them. During 1933, 1,210 cultivated black currant bushes in 214 locations were destroyed, bringing the totals destroyed to December 31, 1933, to 3,179 locations containing 33,158 bushes.

Authorization for Work

White Pine Blister Rust Control is a cooperative project between the United States Department of Agriculture and the Michigan Department of Agriculture. The work in Michigan is carried on under Act No. 313, Public Acts of 1929, which empowers the Commissioner of Agriculture to pursue the control of Blister Rust by destroying either of the host plants, diseased pine, or currant and gooseberry bushes (Ribes) and authorizes him to cooperate with the United States Department of Agriculture, State Department of Conservation, with counties, townships, associations, institutions and individuals for the suppression and control of white pine blister rust.

There is shown the Memorandum of Understanding for Michigan quoted in full.

"MEMORANDUM OF UNDERSTANDING BETWEEN THE UNITED STATES BUREAU OF PLANT INDUSTRY AND THE MICHIGAN BUREAU OF AGRICULTURAL INDUSTRY

Cooperative Work in Controlling White Pine Blister Rust in Michigan

"The object of the cooperative work outlined herein is to accomplish control of the white pine blister rust in Michigan.

"A. The United States Bureau of Plant Industry Will

(1) Arrange for the payment of the salaries and necessary travel expenses of one or more employees who shall conduct cooperative blister rust control work in Michigan.

(2) Provide these employees with subject matter and technical information essential to the proper conduct of their work.

(3) Conduct experiments and demonstrations for the purpose of improving control practices.

(4) Obtain data on the spread of the rust, the interstate move-

ment of host plants and the conditions under which they are grown commercially to supplement federal blister rust quarantines in promoting the effective prosecution of the cooperative control work.

(5) Coordinate blister rust control activities in the several cooperating states by furnishing regional leadership and supervision.

"B. Michigan Bureau of Agricultural Industry Will

(1) Assume the administrative direction of the aforesaid employees of the United States Bureau of Plant Industry.

(2) Cooperate with agencies administering state and federal owned lands, counties, townships, associations, individuals and others in the local eradication of Ribes on a basis satisfactory to the United States Bureau of Plant Industry.

(3) Provide such supervision and checking of local eradication of Ribes as will secure thorough removal of these plants and, in so far as practicable, utilize the facilities of its organization in furthering the cooperative work.

(4) Undertake such destruction of white pines and Ribes in Michigan and such enforcement of State Laws as may be necessary for the effective prosecution of blister rust control work.

(5) Prepare an annual report of all blister rust control work performed under the provisions of this memorandum, one copy of which will be delivered to each of the cooperating parties.

(6) Submit in prescribed form to the United States Bureau of Plant Industry a monthly report of salaries and expenses paid by the State on blister rust control work.

(7) Have all salary and expense vouchers to be paid out of federal funds approved by the man directly in charge of supervising cooperative blister rust control work in the State before being submitted to the United States Bureau of Plant Industry for payment.

"C. It is Mutually Agreed

(1) That the several undertakings of this memorandum shall become effective July 1, 1929, and continue in force until terminated at the option of either party by a written statement to that effect.

(2) That the cooperative plan of work outlined in this memorandum will best accomplish control of white pine blister rust in Michigan.

(3) That persons employed by the United States Bureau of Plant Industry in accordance with this memorandum will engage only in the prosecution of cooperative blister rust control work within their assigned districts, as directed by the Michigan Bureau of Agricultural Industry.

(4) That all persons appointed by the United States Bureau of Plant Industry and its cooperators under this memorandum shall be satisfactory to the cooperating parties.

(5) That the results of the cooperative work may be published jointly or, upon mutual agreement, by either cooperating party, with due credit given to the cooperating agencies. All manuscripts, therefore, shall be submitted for criticism by the cooperating parties before publication, and, all form letters, bulletins and any other circular matter to be mailed in penalty envelopes shall be submitted in manuscript form for approval by the United States Department of Agriculture before being printed or sent out.

(6) That any expenditures involved inthe work herein assumed by the United States Bureau of Plant Industry as contingent upon appropriations being made therefor by Congress, but no federal funds shall be expended in compensation for host plants destroyed in control work.

(7) That, for the fiscal year July 1, 1929 to June 30, 1930 there will be expended by the Michigan Bureau of Agricultural Industry and its cooperators about $20,000.00 and, by the Federal Government in behalf of the Bureau of Plant Industry, about $5,600 in connection with the work herein provided for. Beginning July 1, 1931, the amounts to be expended each fiscal year by the Michigan Bureau of Agricultural Industry and its cooperators and by the Federal Government in behalf of the Bureau of Plant Industry shall be agreed upon in writing and copies of the agreement shall be sent to each of the signatories hereto.

In witness whereof the parties hereunto have severally signed these presents on the respective days and dates hereinafter set forth.

July 15, 1929 (S) Herbert E. Powell
Commissioner, Michigan State Department of Agriculture

July 22, 1929 (S) W. A. Taylor
Chief, Bureau of Plant Industry, U. S. Department of Agriculture

"AMENDMENT TO MEMORANDUM OF UNDERSTANDING Effective July 1, 1929 Between THE UNITED STATES BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE AND THE MICHIGAN BUREAU OF AGRICULTURAL INDUSTRY

Amendment No. 6
Washington, D.C.

Cooperative Work in Controlling White Pine Blister Rust in Michigan

"Whereas,

The Memorandum of Understanding described above contains the following paragraph (c-7):-

'That, for the fiscal year July 1, 1929, to June 30, 1930, there will be expended by the Michigan Bureau of Agricultural Industry and its cooperators about $20,000 and, by the Federal Government in behalf of the Bureau of Plant Industry, about $5,600 in connection with the work herein provided for. Beginning July 1, 1931, the amounts to be expended each fiscal year by the Michigan Bureau of Agricultural Industry and its cooperators and by the Federal Government in behalf of the Bureau of Plant Industry shall be agreed upon in writing and copies of the agreement shall be sent to each of the signatories hereto.'

"And,

Whereas, the said cooperative work in controlling white pine blister rust in Michigan has, by reorganization within the Department of Agriculture, been transferred to the Bureau of Entomology and Plant Quarantine of said Department.

Now, therefore, in accordance with the foregoing provision and pursuant to such reorganization, it is mutually agreed that for the fiscal year July 1, 1934 to June 30, 1935, the Michigan Bureau of Agricultural Industry and its cooperators will expend about $18,200.00 and the Federal Government in behalf of the United States Bureau of Entomology and Plant Quarantine about $43,400 in connection with the work herein provided for, provided, however, that the maximum expended by the Federal Government shall not exceed $45,000.

September 14, 1934 (S) Samuel T. Metzger
Date Commissioner, Michigan State Department of Agriculture

(S) Avery S. Hoyt
Date Acting Chief, Bureau of Entomology & Plant Quarantine,
U. S. Dept. of Agriculture."

Organization

The field force consisted of a State Leader, E. C. Mandenberg, paid on State funds, headquarters at Lansing; J. K. Kroeber, District Agent in charge Upper Michigan, headquarters at Escanaba; and R. I. Thompson, District Agent in charge Lower Michigan, headquarters at Newaygo. The two agents were paid from NRA funds.

During the field season this staff was augmented by temporary agents who supervised the activities of eradication crews and other field parties employed under the various emergency programs. This organization is shown in Table 24.

Labor for performing actual control work and cultivated black currant eradication was obtained from the following agencies: ECW, as conducted by the Forest Service, State Conservation Department, and Park Service, NRA, FERA and CWA.

The approximate number of men classified according to position working under the several programs in shown in Table 25.

Status of the Rust

The disease was first found in Michigan in 1916 on imported white pine in Oakland County and later on imported white pine in Kent County. These trees were promptly destroyed but not before the disease had gained a foothold in the state. In 1926, it was discovered on native white pine in Cheboygan County and in 1929 in Marquette and Dickinson Counties. Subsequent scouting turned it up on white pine in Baraga, Iron, Menominee, Houghton and Ontonagon Counties in the Upper Peninsula, and in Mason, Iosco, Kent, Oceana, Leelanau, Sanilac, Ottawa, Emmet, Otsego, Cheboygan and Alcona Counties in the Lower Peninsula. By 1934, infection on Ribes had been found in over half of the counties of the state.

Spread of the Rust on White Pine

Upper Peninsula

Blister rust was discovered for the first time in 1934 in Ontonagon County, which now brings the total of pine infected counties in the Upper Peninsula to seven. The infection in Ontonagon County occurred on quite a number of trees in a wind-break on a farm near the Village of Green, and on a few trees on top of the Porcupine Mountains. While only one county was added to the list of those in which pine infection has been found, there was a noticeable increase in the intensity of infection in the unprotected pine areas in portions of counties previously reported. The counties now having known pine infections are: Marquette, Dickinson, Menominee, Iron, Garage, Houghton and Ontonagon.

Table 24. - Supervisory Organization, Blister Rust Control, Michigan, 1934.

Jurisdiction	Position	Paid From	Duties
Entire State	1 State Leader	State Funds	In charge, State Control Program Full time.
Upper Michigan	1 District Agent	NRA	In charge, Up.Mich.Contr.Program Full time.
	13 Temp.Field Assts.	"	Supervisive control work and cultivated black currant eradication in assigned sub districts. Part time.
	1 Technician	ECW	Checking and giving technical direction to control work on Federal Lands. Full time.
	7 Tech.Foremen	FS-ECW	Supervisive control work done by CCC in Forest Service ECW Camps. Part time.
	2 Checkers	MECW	Checking and supervising control work and making pre-eradication surveys in assigned districts of three to five MECW Camps. Full time.
	8 B.R.Foremen	MECW	Supervising CCC on control work in ECW Camps. Part time.
	1 B.R.Foreman	Parks ECW	" " " "
Lower Michigan	1 District Agent	NRA	In charge, Lower Mich.Contr.Program Full time.
	28 Temp.Field Assts.	"	Supervising control work and cultivated black currant eradication and making pre-eradication surveys in assigned sub-districts. Part time.
	3 Checkers	MECW	Checking and supervising control work and making pre-eradication surveys in assigned districts, each consisting of from three to five MECW Camps.
	1 Tech.Foreman	FS-ECW	Supervising control work done in FS-ECW Camps. Part time.
	9 B.R.Foremen	MECW	Supervising CCC on control work in ECW Camps. Part time.
	3 B.R.Foremen	Parks ECW	" " " "
	2 Nursery Inspect.	State Funds	Aiding in cultivated black currant eradication. Part time.

Table 25. - Approximate Number of Men Working on the Several Programs by Months, Blister Rust Control Michigan, 1934

Program	Position	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Approx. No. Man-Months
State Funds	State Leader	1	1	1	1	1	1	1	1	1	1	1	1	*** 12
NRA	Dist.Agents	2	2	2	2	2	2	2	2	2	2	2	2	24
	Supervisors	5	5	5	5	5	6	6	6	6	6	7	7	69
	Foremen	3	3	3	3	4	19	30	35	27	24	23	10	184
	Laborers						12	4	20	37	33	9	4	119
	Sub-Totals	10	10	10	10	11	39	42	63	72	65	41	23	396
*FS-ECW	**Technicians	1	1	1	1	1	1	1	1	1	1	1	1	12
	Tech.Foremen					9	8	9	6	5	1	2	1	42
	CCC Laborers					165	196	252	170	170	7			960
	Sub-Totals	1	1	1	1	175	205	262	177	177	9	3	2	1014
Parks-ECW	Foremen							3	4	3	2			12
	CCC Laborers						8	60	75	70	41			254
	Sub-Totals						8	63	79	73	43			266
MECW	Checkers	6	6	6	6	5	5	5	5	5	5	5	5	64
	Foremen					21	17	17	17	17	14			103
	CCC Laborers					250	416	385	506	555	240			2352
	Sub-Totals	6	6	6	6	276	438	407	528	577	259	5	5	2519
FERA	Laborers						24	41	127	341	279	38	13	863
CWA	Foremen	22	24	24										70
	Laborers	22	24	24										70
	Sub-Totals	44	48	48										140
All Progr.	State Leader	1	1	1	1	1	1	1	1	1	1	1	1	12
	Dist.Agents	2	2	2	2	2	2	2	2	2	2	2	2	24
	Supervisors	12	12	12	12	11	12	12	12	12	12	13	13	145
	Foremen	25	27	27	3	34	44	59	62	53	41	25	11	411
	Laborers	22	24	24	0	415	656	742	895	1173	600	47	17	4618
Grand Totals		62	66	66	18	463	715	816	975	1841	656	88	44	5210

*Includes a small number of workers paid from FS-PWA funds.

**Technician paid from ECW assigned to Bur. of Entomology and Plant Quarantine.

***About half of State Leaders time devoted to blister rust control.

Lower Peninsula

Blister rust on pines was discovered for the first time in six additional counties; viz., Ottawa, Sanilac, Alcona, Otsego, Leelanau and Emmet during 1934. The total of pine infected counties in the Lower Peninsula is now twelve. A brief description of the infections found follows:

Ottawa County

One canker noted on young white pine growing within 100 feet of many cultivated black currants -- the canker was 1931 origin and had fruited once. The location is about three miles southeast of the village of Spring Lake on the north side of Grand River.

Sanilac County

White pines were inspected in the village of Port Sanilac, and two cankers were found -- one of 1929 origin and one of 1930 origin. Ribes americanum growing close by were heavily infected. About three miles south and one half mile west of this location two more cankers were found. These were both of 1931 origin. White pines were few in number and the R. americanum very abundant and lightly infected.

Alcona County

Inspection of white pine areas close to Harrisville disclosed two centers of infection. One center had four pines infected. The oldest infection was of 1929 origin, which had fruited, and the youngest was of 1932 origin. The other center of infection disclosed a few juvenile cankers of 1930 origin. Infection was first noted by the local control foreman on wild Ribes eradication work. This pine has been protected.

Otsego County

Inspection of a white pine area near Gaylord disclosed one canker of 1929 origin. Infection was first noted on R. cynosbati by the local control foreman while in charge of eradication work in which FERA labor was being used. This pine area has been protected.

Leelanau County

Infection was discovered in an all-aged stand of white pine growing along the shore of Lake Leland within the village of Leland. This area is quite remarkable for the intensity of the infection and abundance of juvenile cankers. Only a few fruiting cankers were noticed and they were young. Infection was first noted on cultivated black currants growing withinthe pine area. This pine area has been protected. Another infection area was discovered near Glen Arbor on Glen Lake. One canker was found and infection was widely spread on R. americanum and other Ribes species. On this area eradication work was partially performed in 1934 and plans are to complete it in 1935.

Emmet County

White pine was inspected just south of Cross Village and two cankers of 1929 origin were found. They had fruited once. This area is about one and one half miles west of a location of 25 infected black currants which were pulled by the county black currant foreman. R. cynosbati closely associated with the white pines were infected.

Iosco County

A new center of infection was discovered about one and one half miles west of East Tawas. Two large stem cankers were noted -- one on 1927 wood and one on 1929 wood. These cankers had fruited several times and the stems were almost dead. Several other younger cankers were found on other pines. Infections were first observed by the foreman of the eradication crew while he was checking the quality of the work of his crew.

The 1934 season is notable for the numerous new pine infections found. Workers on local control had noted infection on wild Ribes during the eradication work and the agents followed up these leads when scouting for the rust on pines.

With the rust known to be widely distributed no unprotected stand of young white pine will ever reach commercial maturity in the pine infected counties. It is, therefore, evident that control work must continue on an even larger scale than heretofore, if the valuable pine stands are to survive.

Spread of the Rust on Ribes

Upper Peninsula

Previous to 1934, infection on Ribes had been found in thirteen Upper Peninsula counties. Infection was found in Alger and Luce counties during the past year, which now puts all fifteen Upper Peninsula counties on the infected list.

Lower Peninsula

Prior to 1934, infection on Ribes had been found in thirty-four Lower Peninsula counties. It was found in Ottawa, Otsego, Presque Isle, and Emmet counties during the past year, which now puts 38 infected counties in the Lower Peninsula on the infected list. It is quite noticeable that the locations of the infection found this season on both white pines and Ribes are located along the shores of Lake Michigan and Lake Huron.

Blister rust on pines has been found to date in 18 counties and on Ribes only in 54 counties, as shown in Table 26.

White Pine Acreage

The latest estimates of acres of white pine in Michigan based on all available information and pre-eradication surveys are as follows:

1st Priority white pine	275,832 Acres
2nd Priority white pine	300,000 Acres (Est.)
White pine to be protected	575,832 Acres
Scattered white pine	451,614 Acres
Total white pine	1,027,446 Acres

The qualifications for first and second priority pine stands are defined in the following extract from the "Manual of Procedure for Blister Rust Control in the North Central Region".

Minimum Requirements First Priority White Pine Stands

1-6 ft. high	----	200 pines per acre
7-15 ft. high	----	100 pines per acre
16 ft. and up	----	50-75 pines per acre

White pine stands meeting these minimum requirements are considered as first priority pine and unless Ribes conditions are extremely and unusually heavy protection costs are justified.

In the Lake States Region there are large areas of white pine not meeting the above described minimum requirements but which contain white pine trees of sufficient number either to justify limited protection costs in themselves or else responsible for producing well stocked stands of white pine in the future by virtue of being seed trees. These stands of white pine which we may describe as second priority pine can be given a set of minimum requirements approximately one quarter of minimum requirements of pines in the first priority class. These requirements would apply to native stands in forest areas of minimum size of 20 acres with the following number of pines per acre in the different size classes:

Minimum Requirements Second Priority White Pine Stands

1-6 ft. high	----	50 pines per acre
7-15 ft. high	----	25 pines per acre
Over 15 ft. high	----	15 pines per acre

Pre-Eradication Survey

Before and after the eradication season the supervisory personnel devoted its time to making preliminary surveys. This work consisted of making detailed maps of white pine areas worth protecting and estimating the acreage to be worked and necessary man days of labor required. This survey forms the basis of estimating the control program for the coming year.

Table 27. - Pre-Eradication Survey on Federal Forests (ECW Camps)
Michigan, 1934

Camp	Forest	No. Areas	Acres Planting Site Mapped	Acres w.p. to be protected	Acres to be worked by Crew	Acres to be worked by Scout	Acres to be worked by Total	Estimated Man-Days Required Crew	Estimated Man-Days Required Scout	Estimated Man-Days Required Total
				LOWER PENINSULA						
Marietta	Manistee	2	120		430	120	550	145	0	145
Brethren	"	7	1435		0	2920	2920	0	25	25
Hoxieville	"	1	0	160	0	565	565	0	0	0
Peacock	"	1	0	80	0	320	320	0	0	0
Sub-total		11	1555	240	430	3925	4355	145	25	170
				UPPER PENINSULA						
Kentucky	Hiawatha	3		215	52	833	885	18	4	22
Steuben	"	3		72	368	260	628	146	0	146
McComb	"	0		0	0	0	0	0	0	0
Polack Lake	"	2		70	190	212	402	88	3	91
Cooks	"	?		76	270	85	355	102	7	109
Kentucky	"	?	33		120	33	153	68	0	68
Steuben	"	?	2285		426	3938	4364	134	3	137
McComb	"	?	0		0	0	0	0	0	0
Polack Lake	"	?	1575		803	3234	4037	336	11	347
Cooks	"	?	2742		499	5004	5503	312	14	326
Sub-total			6635	433	2728	13599	15327	1204	42	1246
Paint Lake	Ottawa	16		4013	7778	0	7778	5656	0	5656
Jumbo	"	4		382	1592	0	1592	664	0	664
Watersmeet	"	7		537	1969	0	1969	1108	0	1108
James Lake	"	21		3140	7229	0	7229	3575	0	3575
Kenton	"	5		492	1360	0	1360	927	0	927
Pori	"	3		287	770	0	770	710	0	710
Sturgeon	"	1		44	220	0	220	120	0	120
Sub-total		57		8895	20918	0	20918	12760	0	12760
Raco	Marquette	9		926	378	2061	2439	404	29	433
Strongs	"	3		535	1450	220	1670	462	7	469
Pine River	"	4		492	680	795	1475	320	13	333
Moran	"	5		562	798	873	1676	635	46	681
Sub-total		21		2515	3306	3954	7260	1321	95	1915
Sub-total, Upper Peninsula			6635	11843	26952	17553	44505	15785	137	15922
TOTAL-UPPER & LOWER PENINSULA			8190	12083	27382	21478	48860	15930	162	16092

Table 28. - Costs of Pre-Eradication Surveys, National Forests,

Michigan, 1934

	Man-Days used				Costs			
Forest	F.S. E.C.W.	Tech. E.C.W.	N.R.A.	Total	F.S. E.C.W.	Tech. E.C.W.	N.R.A.	Total
Manistee	48	0	0	48	271.56	0	0	271.56
Hiawatha	84	1	0	85	467.77	11.11	0	478.88
Ottawa	100	48	47	195	599.24	420.58	266.42	1,286.24
Marquette	44	2	7	53	243.60	20.82	37.08	301.50
Total	276	51	54	381	1,582.17	452.51	303.50	2,338.18

Table 2[illegible] - [illegible]

Camp	County	No. Areas	[illegible] Period	[illegible]	[illegible]	[illegible]	Total	[illegible]	[illegible]	Total
				LOWER PENINSULA						
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"	Crawford	[illegible]		13[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Black Lake	[illegible]	1		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"	Presque Isle	12		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Fife Lake	Grand Traverse	15		1431	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"	Kalkaska	7		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Crawford	12		2018	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"	[illegible]	4		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	6		[illegible]	[illegible]	[illegible]	1607	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	14		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"	Oscoda	5		517	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] River	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Cheboygan	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"	[illegible]	13		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TOTAL, [illegible]		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 31. - Summary of Pre-eradication Surveys, all Agencies, Michigan, 1934.

Agency	No. of Areas	Acres Planting Site Mapped	Acres W.p to be protected	Acres to be worked by: Crew	Scout	Total	Estimated man-days required: Crew	Scout	Total
				LOWER PENINSULA					
F.S.-E.C.W.	11	1555	240	430	3925	4355	145	25	170
M.E.C.W.	166	1150	20275	15939	45428	62367	10038	362	10400
N.I.R.A.	324	152	26218	29773	62922	92695	19001	1067	2068
Sub-total	501	2857	46733	46142	113275	159417	29184	1454	12638
				UPPER PENINSULA					
F.S.-E.C.W.	?	6635	11843	26952	17553	44505	15735	137	15922
M.E.C.W.	151	0	36219	51315	30270	81585	27316	1757	29073
N.I.R.A.	114	0	18836	40902	15380	56282	15468	473	15941
Sub-total		6635	66898	119169	63203	182372	58569	2367	[illegible]
TOTAL		9492	113631	165311	176478	341789	87753	3821	[illegible]

Table 32. - Total Cost of Pre-Eradication Survey, Michigan, 1934.

	N.I.R.A.	M.E.C.W.	F.S.-E.C.W.	E.C.W. Technicians	T.E.R.A.	STATE	TOTAL	Cost per acre of Pre-eradication Survey: W.p. to be protected	Area to be worked
				LOWER PENINSULA					
F.S.-E.C.W.			271.56				271.56	.15a	.05
M.E.C.W.	232.92	3620.31				21.90	3875.13	.18a	.06
N.I.R.A.	3844.57				22.80	171.54	4038.91	.15a	.01
Sub-total	4077.49	3620.31	271.56	0	22.80	193.44	8185.60	.17a	.05
				UPPER PENINSULA					
F.S.-E.C.W.	305.50		1310.61	452.51			2066.62	.11a	.05
M.E.C.W.	1045.80	2496.37					3542.17	.10	.04
N.I.R.A.	2142.30	193.04				4.34	2339.68	.12	.04
Sub-total	3493.60	2689.41	1310.61	452.51	0	4.34	7948.47	.11	.04
TOTAL	7571.09	6309.72	1582.17	452.51	22.80	197.78	16134.07	.13	.05

a. Based on cost per acre of white pine and white pine plantings area covered by pre-eradication surveys.

Table 33. - Showing Number Man-days used in Making Pre-eradication Surveys.

Michigan, 1934

District	Agency	Man-days used in mapping Labor	Supervision	Total
Lower Pen.	MECW	100	503	603
	NRA	-	670	670
	FS-ECW	48	-	48
	FERA	10	-	10
	Sub-total	158	1173	1331
Upper Pen	MECW	57	333	390
	NRA	-	469	469
	FS-ECW	228	51	279
	Sub-total	285	853	1138
State Total		443	2026	2469

Pre-Eradication Survey of White Pine Planting Sites

The purpose of making a pre-planting survey is to determine the amount of work which will be involved in protecting the proposed plantations from blister rust. The work consists of examining lands suitable for the planting of white pine in relation to Ribes conditions. There are hundreds of thousands of acres of idle land in Michigan suitable to the growing of white pine where a minimum amount of control work is necessary due to the scarcity of Ribes. It is on such lands that white pine should be planted.

On the Superior State Forest, out of Superior CCC Camp 100-S, there are 12,932 acres found to be Ribes free, of which white pine can safely be planted on 9,400 acres.

Seven tables deal with pre-eradication surveys as follows:

Tables 27 and 28 cover the work on Federal forests.

Table 29 deals with surveys made out of MECW camps.

Table 30 includes surveys performed by NRA but independent of other agencies.

Table 31 summarizes all pre-eradication survey work.

Table 32 totals the costs of all surveys.

Table 33 shows the total number of man days given to this project by the various agencies.

It is interesting to notice how NRA funds have been active in the various other agency survey activities. NRA funds have participated in practically all pre-eradication surveys that were conducted in Michigan's 1934 program.

Local Control

Before the advent of the Civilian Conservation Corps and other relief agencies, pine owners had to supply the labor, while the State and Federal Governments supplied the supervision. However, since the two above mentioned sources of labor have been made available to this work, many pine areas, regardless of ownership, have been protected at no expense to the owner. This initial eradication will remain effective for a period of from three to five years, after which time the areas should be re-worked due to the recurrence of Ribes from seeds, sprouts or bushes missed by the crew.

Eradication work was performed by the Civilian Conservation Corps Camps, of which there are three groups:

(1) Emergency Conservation Work (ECW) Camps, which confine their activities to lands inside the boundaries of the Federal forests.

(2) Michigan Emergency Conservation Work (MECW) Camps, which confine their activities to lands outside the boundaries of the Federal forests. In the nine Upper Peninsula camps there were seven blister rust foremen supervising 225 CCC laborers. In addition to the above camps, owing to the large pine areas in the vicinity of Big Bay Camp, permission was obtained through the MECW office in Lansing, Michigan, to establish a side camp out of this camp. This side camp was in charge of one foreman supervising 25 CCC laborers. Numerous comments were made on the efficiency of this side camp. In the thirteen Lower Peninsula camps there were nine blister rust foremen supervising 325 CCC laborers.

All local control work carried on by the MECW camps was supervised by MECW blister rust checkers -- two in the Upper Peninsula and three in the Lower Peninsula.

(3) Park Camps which confine their activities to lands in State and National parks and vicinities. In the one Upper Peninsula camp there was one blister rust foreman supervising 25 CCC laborers. In the three Lower Peninsula camps there were three foremen supervising 70 CCC laborers.

Besides the work accomplished by CCC camps, eradication work was also performed by Federal Emergency Relief (FERA) labor. FERA eradication work was conducted in three Upper Peninsula counties, using 92 laborers supervised by three Nira foremen and one Nira checker. In the Lower Peninsula, work was conducted in 10 counties, making use of 223 FERA laborers supervised by six Nira foremen and three Nira checkers.

The following tables show results of local control work carried on under these various programs.

Table 34 shows results of local control work carried on in the National forests by ECW camps.

Table 35 shows results of local control work from MECW camps, initial and second eradication.

Table 36 shows results of local control work out of the National Park camps.

Table 37 shows results of local control work with FERA labor.

Table 38 shows results of local control work performed by Nira agents.

Table 39 shows results of local control work with all agencies in Michigan during 1934.

Table 40 shows ownership of lands upon which local control work was performed.

Table [illegible]

Camp	No. Jobs	Acres to be pre-lotted	Crew	Scout	Total	Crew	[illegible]	[illegible]	Super-vision	Labor*	Other [illegible]	Total
					LOWER PENINSULA	- [illegible]						
Au Sable	6	385	310	806	1,170	[illegible]	[illegible]	[illegible]	46	[illegible]	[illegible]	[illegible]
Black Lake	20	2,456	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Fife Lake	21	2,777	316	[illegible]	6,447	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	14	2,065	216	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Luzerne	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] River	9	809	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	5	[illegible]	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pigeon River	[illegible]	1,416	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pioneer	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Presque Isle	16	1,885	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wolverine	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total	159	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	1	100	107	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total	160	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
					UPPER PENINSULA	- [illegible]						
Sturgeon River	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Big Bay (Marq.)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Big Bay (Alger)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Escanaba River	7	1,909	[illegible]	500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Superior	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cusino	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Manistique	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] River	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total, 1st Grad.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total, 2nd Grad.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Grand Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* Labor includes cost of transportation and supplies.
a Includes [illegible] cost of [illegible] Checker acting as Foreman for [illegible]
b Includes [illegible] cost of [illegible] Checker acting as Foreman for [illegible]
c Includes [illegible] State expense.

[illegible]

Table 86. - Local Control, State Park Camps, Michigan, 1934.

Park No.	Park	No. of Jobs	Acres s. p. pro-tected	Acres worked: Crew	Acres worked: Scout	Acres worked: Total	Ribes pulled: Crew	Ribes pulled: Scout	Ribes pulled: Total	Man-Days: Labor	Man-Days: Super-vision	Costs: Labor	Costs: Super-vision	Costs: Total
							Lower Peninsula							
	Initial Erad.													
SP-3	Dodge Bloomer	0	576	409	1777	2186	65188	1303	66491	475	38½	475.00	*222.35	695.[illegible]
SP-8	Hartwick Pines	1	740	156	1018	1167	150038	130	150168	583	21½	583.00	157.90	[illegible]
SP-6	Muskegon	11	2802	534	11465	11999	161632	512	162144	637½	75	635.60	490.98	1126.[illegible]
	Sub-total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1947	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Second Erad.													
SP-8	Hartwick Pines	1	500	378	520	898	22980	0	22980	237	15	237.00	117.50	354.[illegible]
SP-6	Muskegon	4	1172	44	2537	2581	6258	430	6688	35	7	35.00	41.08	76.[illegible]
	Sub-total	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
							Upper Peninsula							
	Initial Erad.													
SP-9	I.H. Wells	8	79	599	38	627	163819	145	163964	577	30½	**607.30	143.50	750.00
	Grand Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* Includes $76.27 cost of NRA Agent acting as foreman for 11 man-days, and $2.20 state expense.

** Includes $20.80 cost of Crew transportation.

Table 37. - Local Control, FERA Program, Michigan, 1934, Initial Eradication.

County	No. jobs	Acres w. p. pro-tected	Acres worked: Crew	Acres worked: Scout	Acres worked: Total	Ribes pulled: Crew	Ribes pulled: Scout	Ribes pulled: Total	Man-Days: Labor	Man-Days: Super-vision	Costs: Labor*	Costs: Super-vision*	Costs: Total
						Lower Peninsula							
Alcona	4	618	1318	774	2092	54365	12	54377	280	67	671.10	296.05	967.15
Antrim	1	90	90	0	90	74464	0	74464	125	38	467.25	145.65a	[illegible]
Benzie	1	184	253	297	550	28198	0	28198	264	28	719.20	111.00	[illegible]
Iosco	7	563	680	927	1607	178400	124	178524	577	68	1589.70	288.35	1878.05
Kent	7	541	1506	1924	3430	690334	11262	701596	1430	124½	5815.70	248.00	6063.70
Leelanau	5	579	1213	298	1511	63433	1122	64555	671	68	1607.70	351.60	1959.30
Manistee	7	642	559	2298	2857	96273	0	96273	271	34	865.60	130.50	996.10
Montcalm	10	403	651	2278	2929	102783	6074	108757	425	42	936.75	215.25b	1152.[illegible]
Otsego	6	436	415	1237	1652	45969	245	46214	106½	41	462.00	239.63	701.63
St. Clair	3	140	390	448	838	104645	5580	110225	368	22	1225.30	140.61	[illegible]
Sub-total	53	4185	7175	10481	17556	1,439004	24319	1,463323	4579½	526½	14559.60	2166.94	[illegible]
						Upper Peninsula							
Delta	1	182	287	56	343	32119	0	32119	125	21	200.80	95.30	296.30
Gogebic	15	1561	4576	173	4749	329985	360	330345	605½	157	2477.60	325.50c	2803.30
Menominee	12	321	1934	600	2534	389219	9322	398541	473	132	1919.49	225.50d	2145.00
Sub-total	28	2064	6797	829	7626	751323	9682	761005	1203½	310	4597.89e	646.30	[illegible]
Grand Total	81	6249	13972	11310	25182	2,190327	33901	2,224328	5783	836½	19058.49	2806.34	21863.07

* Labor includes $978.40 NIRA Straw Boss wages.
* Supervision includes transportation.
a Includes $48.95 State Salary.
b, Includes $10.65 cost of NIRA Agent acting as foreman.
c. Includes $924.80 NIRA Straw Boss wages.
d Cost of NIRA Agent acting as foreman.

Table 36 - Local Control, Ribes Program, Michigan, 1934

Initial Eradication

County	No. of Jobs	pro- tected	Acres worked Crew	Acres worked Scout	Acres worked Total	Ribes pulled Crew	Ribes pulled Scout	Ribes pulled Total	Man-days Labor	Man-days Super- vision	COSTS Labor	COSTS Super- vision	COSTS Total
Huron	1	1	0	95	95	0	50	50	0	1	0	6.85	6.85
Mecosta	1	50	0	185	185	0	0	0	0	½	0	2.85	2.85
Osceola	1	30	0	210	210	0	0	0	0	½	0	2.85	2.85
TOTAL	3	81	0	410	410	0	50	50	0	[illegible]	0	*[illegible]	[illegible]

* BEPQ Agents acting as Foreman.

* [illegible] See Table 53. There is [illegible] $5,466 of [illegible] [illegible] [illegible] The [illegible] 3. [illegible] =

Table 40. - Acres White Pine Protected, Michigan 1934, Classified by Program & Ownership

Program	Private	Municipal	County	State Forest	State Parks	Forest Service	Total	% Total
				Lower Michigan				
FERA	4,045	22		118			4,135	5.7
NRA		31		20			51	.1
State ECW	3,714	1,129	200	19,543			b. 24,586	33.8
Parks ECW	5,949				1,227		d. 7,176	9.8
FS-ECW						600	600	.8
Sub-total	13,708	1,182	200	19,681	1,227	600	36,[illegible]	50.[illegible]
				Upper Michigan				
FERA	1,743		298	23			2,064	2.8
State ECW	16,556	371		8,560			c. 25,487	35.0
Parks ECW	12		12		55		79	.1
FS-ECW						8,694	a. 8,694.5	11.9
Sub-total	18,311	371	310	8,583	55	8,694	36,[illegible]	49.[illegible]
Grand Total	32,019	1,553	510	28,264	1,282	9,184	72,922.5	
Percent Total	44.0	2.1	.7	38.8	1.8	12.6		100.0

a. Does not include 200 Acres Re-eradication
a. Includes 545 Planting Site
b. Does not include 107 Acres Re-eradication
c. Does not include 919 Acres Re-eradication
d. Does not include 1372 Acres Re-eradication

Table 41. - Summary by years, Local Control, Michigan, 1928--1934, inclusive.

Year	Acres worked			Ribes	Total	Per Acre		Cost
	Initial	Re-Grad	Total	Killed	Cost	Cost	Ribes	per Bush
1928	1,500	0	1,500	83,051	739.32	$ .49	55.2	[illegible]
1929	2,530	40	2,570	171,373	3,607.63	1.40	66.5	.0211
1930	6,518	60	6,578	373,456	5,181.94	.79	56.7	.0138
1931	12,252	0	12,252	505,927	4,369.52	.36	41.2	.0086
1932	16,871	420	17,291	1,172,149	7,038.79	.41	67.0	.0060
1933	49,002	1,251	50,253	3,543,967	20,659.08	.41	70.5	[illegible]
1934	194,321.5	6,402	201,233.5	13,721,083	101,713.03	.51	68.2	.0074
Total	282,504.5	8,172	291,677.5	19,571,0[illegible]	148,279.31	.42	65.6	[illegible]

Table 41 shows summary by years of local control in Michigan, 1926 to 1934 inclusive.

The status of local control work in Michigan at the end of 1934 is as follows:

Acres white pine to protect	576,352	
Acres white pine initially protected	105,079	+ 78,2[illegible]
Percent white pine initially protected	18.2	
Acres white pine given second eradication	4,046	= 183,375
Percent white pine given second eradication	2.9	= 31.8%

In order to insure high quality work, all eradication work was carefully checked by blister rust checkers and the regular blister rust personnel. In order to pass final examination it is necessary that each area have not to exceed twenty-five feet of live stem per acre on it after eradication. The season's checking results of work done by the MDCW and FS-ECW, Upper Michigan only, are shown in Tables 42 and 43.

Analysis of Ribes Eradication by Ribes Types

As mentioned elsewhere in this report, there are six Ribes types in each of which the Ribes abundance varies within relatively narrow limits. These Ribes types in brief are:

A - Live Swamp - Alder swamp, cedar swamp, spruce tamarack swamp, etc. Ribes abundant.

B - Muskeg Swamp - Muskeg, peat, sedges, etc. Ribes usually absent except at margins.

C - Hardwoods - Beech, maple, hemlock, upland. Ribes usually numerous.

D - Pine - Jack pine, Norway pine, white pine, often aspen. Sandy soils. Ribes usually few to absent.

E - Pasture - Cut over, grazed lands. Ribes vary in abundance. Usually large bushes.

F - Cultivated - Cultivated fields or meadows. Ribes absent except along fence rows.

During the winter of 1935 the eradication job reports in the Lake States were broken down to show acres worked, Ribes pulled and man days by the different Ribes types and agencies doing the work. These data were then grouped to show Ribes per acre and man days per acre by Ribes types and Ribes per acre classes. This analysis in Michigan covered about two thirds of the work done. Owing to the pressure of other work, this analysis was not completed. However, the partial results of these studies are shown in Tables 44 and 45.

Table 42. — Results of Checking E.C.W. Ribes Eradication
Upper Michigan, 1934.

Ribes per Acre Class	Ribes Eradication: Acres Worked	Ribes Eradication: Total Ribes Pulled	Ribes Eradication: Bushes per Acre	Checking: Acres in Check	Checking: Found: Bushes	Checking: Found: F.L.S.	Checking: Per Acre: Bushes	Checking: Per Acre: F.L.S.	[illegible]
			Ribes Type "A"						
0	210	0	0	0	0	-	-	-	[illegible]
1-200	4098	381,999	93	104.5	1344	2106.8	12.9	20.2	[illegible]
201-400	1015	287,398	283	25.7	417	439.3	16.0	17.2	[illegible]
401-600	451	212,929	474	23.0	224	498.3	13.5	21.1	[illegible]
601-800	100	76,050	770	0.0	-	-	-	-	[illegible]
801-1000	30	24,700	822	1.4	23	27.9	17.2	20.7	[illegible]
1001-1200	95	107,658	1129	5.0	103	89.9	20.6	17.9	[illegible]
1401-1600	60	86,802	1447	1.0	17	22.0	17.0	22.0	[illegible]
1601-1800	62	106,023	1710	2.1	59	45.9	22.0	21.9	[illegible]
1801-2000	350	679,565	1942	13.5	134	273.9	9.9	17.1	[illegible]
2001+	59	214,272	3632	6.0	110	75.4	19.3	12.2	[illegible]
Sub-totals	5307	2,174,432	234	181.2	2493	3561.3	13.8	19.6	[illegible]
			Ribes Type "C"						
0	6481	0	0	120.4	0	0	0	0	[illegible]
1-200	9675	302,993	31	194.1	1026	2131.6	5.4	10.9	[illegible]
201-400	820	268,438	327	20.3	189	228.4	6.3	11.4	[illegible]
401-600	55	31,660	576	2.0	9	25.0	4.5	12.5	[illegible]
1001-1200	50	55,100	1102	1.0	22	21.5	22.0	21.5	[illegible]
Sub-totals	17081	658,191	39	338.2	[illegible]	2411.2	3.6	7.1	14.2
			Ribes Type "D"						
0	13600	0	0	206.4	16	41.0	0.1	0.2	[illegible]
1-200	8974	378,554	43	152.6	972	2328.1	6.4	15.2	[illegible]
201-400	200	75,686	379	3.8	41	55.6	10.6	14.5	[illegible]
Sub-totals	22774	454,240	20	362.7	1029	2424.7	2.8	6.7	[illegible]
			Ribes Type "E"						
0	515	0	0	3.8	0	0	0	0	[illegible]
1-200	1092	48,304	44	19.7	22	79.4	1.1	4.0	[illegible]
1601-1800	5	8,114	1623	2.0	15	27.6	7.5	13.8	[illegible]
2001-2200	15	32,000	2133	3.0	0	0	0	0	[illegible]
Sub-totals	1630	88,418	54	28.5	37	107.0	1.3	3.8	[illegible]
Grand Total	47572	3,375,431	71	910.9	4788	8504.4	5.2	9.2	[illegible]

Table 45. - Results of Checking F.S.-E.C.W. Ribes Eradication
Upper Michigan, 1934.

Ribes per Acre Class	Ribes Eradication: Acres Worked	Ribes Eradication: Total Ribes Pulled	Ribes Eradication: Bushes per Acre	Checking: Acres in Check	Checking: Found Bushes	Checking: Found F.L.S.	Checking: Per Acre Bushes	Checking: Per Acre F.L.S.	% Bushes [illegible]
			Ribes Type "A"						
0	60	0	0	0	0	0	0	0	0
1-200	880	106,084	120	23.5	98.0	242.[illegible]	4.2	10.3	[illegible]
201-400	230	88,513	384	[illegible]	17.0	25.0	5.[illegible]	14.0	[illegible]
401-600	221	121,682	550	11.0	131.0	199.[illegible]	11.9	16.3	[illegible]
601-800	148	104,[illegible]	708	[illegible]	21.0	67.0	[illegible].6	11.2	[illegible]
801-1000	140	130,064	929	3.0	18.0	24.5	6.0	8.2	[illegible]
1001-1200	50	57,500	1150	1.0	20.0	25.[illegible]	20.0	25.[illegible]	[illegible]
1201-1400	145	184,[illegible]	1275	9.[illegible]	100.0	138.[illegible]	11.1	15.7	[illegible]
1601-1800	218	353,275	1620	11.5	55.0	182.5	4.8	15.9	[illegible]
1801-2000	415	761,782	1835	9.0	97.0	162.0	10.2	18.0	[illegible]
2601-2800	18	49,512	2750	1.0	3.0	7.5	3.0	7.5	[illegible]
3201-3400	12	38,511	3209	1.0	3.0	15.0	3.0	15.0	[illegible]
Sub-totals	2559	1,99[illegible]	781	75.5	555.[illegible]	1079.2	[illegible]	13.7	[illegible]
			Ribes Type "C"						
0	2856	0	0	12.5	0	0	0	0	0
1-200	4413	265,321	60	61.5	229.0	330.7	3.7	5.4	[illegible]
401-600	93	45,228	486	2.0	1.0	3.0	0.5	1.5	[illegible]
801-1000	330	320,674	971	2.0	14.0	25.0	7.0	14.0	[illegible]
Sub-totals	7690	[illegible]	82	78.0	[illegible]	[illegible]	3.1	4.5	[illegible]
			Ribes Type "D"						
0	2061	0	0	21.8	0	0	0	0	0
1-200	6088	152,064	25	[illegible]	264.0	[illegible]	3.7	4.5	[illegible]
Sub-total	8149	152,064	19	[illegible]	264.0	[illegible]	[illegible]	[illegible]	[illegible]
Grand Total	18398	2,766,168	151	23[illegible]	1081.[illegible]	1667.[illegible]	[illegible]	7.6	[illegible]

Reference is made to Table 44. Note the large percentage of Ribes eradication necessary in Ribes Type A, Live Swamp. This type occupied only 10.5% of the area worked. From it was removed 73.9% of the Ribes at a cost of 65.6% of the man days.

Note also that Type D, Pine, occupied nearly 50% of the area and supported only 7.4% of the Ribes removed at a cost of 12.6% of the man days.

It is obvious that other things being equal the more abundant are Ribes bushes the larger the number pulled per day, for the reason that a larger percentage of the time is actually devoted to pulling bushes than to searching for them. This principle is well illustrated in Table 44.

Using Ribes pulled per man day as a criterion of work done, note the apparent superiority of the FERA laborers over the CCC men in working corresponding Ribes types. In Types A, C, D and total types a larger average number of bushes were pulled per man day by the FERA forces than by the CCC crews. In Type B five more bushes per man day were pulled by the latter than by the former. The number of hours worked per day by each of these forces was approximately the same -- the CCC men putting in six hours on the job, while the FERA worked seven and a half to eight hours including travel and lunch time. For the most part, however, the FERA men were men of an older age class, mature, who seemed to take their work more seriously than the CCC group.

Reference is made to Table 45. Note that in Upper Michigan Ribes bushes are quite generally distributed, while in Lower Michigan they occur in greater concentrations on smaller portions of the area. In the Upper Peninsula 69.2% of bushes pulled were found on A Type 12.1% of the area, while in the Lower Peninsula [illegible]% were found on only 7.4% of the area.

This same trend is noted in the average number of bushes pulled per acre. Although the average number of bushes per acre on all types was nearly the same in both portions of Michigan, there were in A Type 622 bushes per acre in Southern Michigan as contrasted with 432 in Northern Michigan. In each of the other three Ribes types there were definitely larger numbers of Ribes in the Upper than in corresponding types in the Lower Peninsula.

Again, this same relationship is apparent when the acreage worked by crew and scout is considered. Presumably practically all of Ribes Types A and C in both portions and Type B in Upper Michigan had Ribes so abundant as to require crew work. On this assumption approximately 90.5% of the bushes were distributed on 45% of the area crew worked in the north; while in Southern Michigan 96.[illegible]% of the bushes were found on 32% worked by crews.

Table 44. - Ribes Eradication Performed by F.S.-E.C.W; M.E.C.W; F.E.R.A, Classified by Ribes Types, and Agencies, Michigan, 1934.

	Number			Percent of Total			Per Acre Average		Ribes
Ribes Type	Acres Worked	Ribes Pulled	Total Man-Days	Acres Worked	Ribes Pulled	Total Man-Days	Ribes	Man-Days	Pulled per Man-Day
					F.S.-E.C.W. and M.E.C.W.				
A-Live Swamp	11,400	6,317,075	22,047.66	9.5%	74.8%	67.0%	544	1.93	287
C-Hardwoods	33,171	1,376,985	6,334.57	27.6	16.6	19.2	42	0.19	217
D-Pine	73,053	642,089	4,216.75	60.9	7.7	12.8	9	0.06	150
E-Pasture	2,389	88,507	311.20	2.0	1.1	1.0	37	0.13	284
Total	120,013	8,304,643	32,910.18	100.0	100.0	100.0	69	0.27	252
					F.E.R.A.				
A-Live Swamp	3,007	1,412,213	2,872.30	17.2%	71.0%	56.7%	470	0.95	492
C-Hardwoods	4,900	423,381	1,540.50	27.9	21.3	30.4	86	0.31	275
D-Pine	6,641	122,791	545.70	37.9	6.2	10.8	18	0.08	225
E-Pasture	2,980	29,951	107.30	17.0	1.5	2.1	10	0.04	279
Total	17,528	1,988,336	5,065.80	100.0	100.0	100.0	113	0.29	392
					Entire State				
A-Live Swamp	14,407	7,609,275	24,919.96	10.5%	73.9%	65.6%	528	1.73	305
C-Hardwoods	38,071	1,800,366	7,875.07	27.7	17.5	20.7	47	0.21	229
D-Pine	79,694	764,880	4,762.45	57.9	7.4	12.5	10	0.06	161
E-Pasture	5,369	118,458	418.50	3.9	1.2	1.1	22	0.08	283
Total	137,541	10,292,979	37,975.98	100.0	100.0	100.0	75	0.28	271

Table 45. - Ribes Eradication Performed by F.S.-E.C.W.; M.E.C.W.; F.E.R.A.
Classified by Ribes Types and Districts.

Ribes Type	Number: Acres Worked	Number: Ribes Pulled	Number: Total Man-Days	Percent of Total: Acres Worked	Percent of Total: Ribes Pulled	Percent of Total: Total Man-Days	Per Acre: Ribes	Per Acre: Man-Days	Ribes Pulled per Man-Day
				Upper Michigan					
A-Live Swamp	10,914	4,739,079	14,698.16	12.1%	69.2%	58.6%	434	1.35	322
C-Hardwoods	26,592	1,353,683	5,918.47	29.3	19.8	23.6	51	0.22	229
D-Pine	49,960	651,486	4,132.55	55.2	9.5	16.5	13	0.08	158
E-Pasture	3,031	106,770	335.00	3.4	1.5	1.3	35	0.11	319
Total	90,497	6,851,018	25,084.18	100.0	100.0	100.0	76	0.26	273
				Lower Michigan					
A-Live Swamp	3,493	2,870,196	10,221.80	7.4%	83.4%	79.3%	822	2.93	281
C-Hardwoods	11,549	446,683	1,956.60	24.5	13.0	15.2	39	0.17	228
D-Pine	29,734	113,394	629.90	63.1	3.3	4.9	4	0.02	180
E-Pasture	2,338	11,688	83.50	5.0	0.3	0.6	5	0.04	140
Total	47,114	3,441,861	12,891.80	100.0	100.0	100.0	73	0.27	267
				Entire State					
A-Live Swamp	14,407	7,609,275	24,919.96	10.5%	73.9%	65.6%	528	1.73	305
C-Hardwoods	38,071	1,800,366	7,875.07	27.7	17.5	20.7	47	0.21	229
D-Pine	79,694	764,880	4,762.45	57.9	7.4	12.6	10	0.06	161
E-Pasture	5,369	118,458	418.50	3.9	1.2	1.1	22	0.08	283
Total	137,541	10,292,979	37,975.98	100.0	100.0	100.0	75	0.28	271

Nursery Sanitation

In order that seedling stock in the various forest nurseries of the state be free from blister rust, control measures similar to "Local Control" are employed, differing only from the latter in that an added safeguard is taken by removing all Ribes within 1500 feet instead of the usual 900 foot protective zone and all European black currants within at least one mile of the nursery. In order to qualify a nursery to pass quarantine inspection, it is necessary to reduce the feet of live stem of Ribes per acre to zero. Because of these strict requirements a nursery must usually be reworked several times before it passes quarantine specifications.

It is imperative that nurseries which ship stock interstate be thoroughly cleaned up, so that they will meet the rigid requirements of the Federal Plant Quarantine Regulation No. 63, which permits shipment of white pine stock only after a thorough inspection by quarantine officials is made and the nursery which grew the plants is found to be in a sanitary condition. As the shipping permit is granted annually, the nurseries must be reworked and checked every year.

Nursery sanitation was undertaken in two Upper Peninsula forest nurseries -- the Manistique and the Dunbar.

The Manistique Nursery was partially worked in 1933 and completely gone over in 1934. The work was done by local men hired by the Forest Service on Fire Funds and by members of the Civilian Conservation Corps. The work was supervised by a regular blister rust agent. Ribes conditions at this nursery are such as to make it an extremely difficult eradication project, and it was necessary for the crews to go over the ground as many as four and five times.

The Dunbar Forest Nursery was first protected in 1929, reworked in 1930, and partially reworked in 1933. This nursery was again gone over completely during 1934, it being necessary to do this because the nursery itself had been moved a quarter mile east of its old location in 1932.

Nursery sanitation was undertaken in two Lower Peninsula Forest Service nurseries -- the Chittenden and the Beal.

The Chittenden Nursery, located at Wellston, Michigan, in the Manistee National Forest, was started for the first time and completely worked in 1934. The work was done by CCC labor out of Manistee River and Hoxeyville Camps. The work was supervised by a technical assistant on the Forest. Ribes conditions in this nursery were such as to make it an extremely difficult eradication project, and it was necessary for the crews to go over the ground five different times. Approximately 10 acres of swamp were covered by the crew. The balance of the area is an oak type on which our observations have shown us Ribes occur very rarely. This type was not difficult to work. A careful check of the nursery was made after the eradication work job was completed, and the work was well done. However, owing to the lateness of the season the sanitation work was not

checked by a member of the Division of Domestic Plant Quarantine.

The Beal Forest Service Nursery located at East Tawas in the Huron National Forest was first worked in 1929 and reworked in 1932. In 1933 the nursery was increased in size which made additional eradication work necessary. The control work of removing cultivated bushes in the new addition to be worked was undertaken late in the season in 1933. Because of the lateness of the season no attempt was made to do wild eradication work until 1934. In 1934 the Beal Nursery was reworked two different times and the final check disclosed the fact that the work did not measure up to the quarantine inspection requirements. It will be necessary to go over the nursery again in the spring of 1935 and bring it up to the standards required by the quarantine inspection officials.

The 1934 accomplishments are listed in Table 46 while the costs involved are shown in Table 47.

In Table 48 nursery eradication work since it was started in 1929 to the present time is shown.

<u>Cultivated Black Currant Eradication</u>

The European cultivated black currant is the most susceptible host plant of blister rust, and the spores produced from this plant infect pines at a greater distance than any other species of Ribes, and for this reason this Ribes is the greatest single factor in spreading the disease.

Because these bushes are grown only under cultivation, seldom being found as escapes, a special campaign is necessary to bring about the complete eradication of this species. This work is carried on by specially trained men who cover each county systematically, visiting every house occupied or vacant in urban and rural communities. The bushes when found are destroyed under authority of the Michigan Blister Rust Control Law, which declares the cultivated black currant a public nuisance.

Prior to 1934 seven Upper Peninsula counties had been freed of the cultivated black currant, and the remaining eight counties were covered this year, so that now every Upper Peninsula county has been worked. This work was performed by county relief labor, both CWA and FERA, under the supervision of trained men employed by the State and Federal Departments of Agriculture.

Prior to 1934 12 Lower Peninsula counties had been freed from these bushes and work had been started in 14 additional counties. In 1934 black currant eradication work was performed in these latter and other counties by relief labor, both CWA and FERA, under the supervision of trained men employed by the State and Federal Departments of Agriculture. The foremen in charge of black currant eradication work in the counties were hired locally and were paid from ERA funds. This arrangement worked out very nicely for these men were well acquainted with the inhabitants of the county and the land descriptions. Supervision of cultivated black currant work was carried on by two temporary Agents —

Table 46. - Nursery Sanitation Work Performed, Michigan, 1934.

Nurseries	Cooper-ating	Program	Acres Protect. in Nursery	Acres Scouted by Crew	Acres Scouted by Scout	Acres Scouted by Total	CCC	Ribes Pulled: Other Cult. Bushes	Ribes Pulled: Wild Plants	Ribes Pulled: Total Ribes	Eradi-cation	Times Worked in 1934
[illegible]	F.S.	[illegible]	30	18	12	30	0	10	1,325	1,[illegible]	[illegible]	1st
				50	250	300		61	1,[illegible]	1,[illegible]	—	2nd
	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]
Chittenden Nursery	F.S.	[illegible]	80	590	0	590	0	90	151,385	151,[illegible]	[illegible]	1st
				55	0	55	0	0	7,909	7,909		2nd
				30	0	30	0	0	1,644	1,644		3rd
				55	0	55	0	0	649	649		4th
				141	0	141	0	0	1,[illegible]	1,[illegible]		5th
	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	State	[illegible]	2	618	0	618	0	0	4,295	4,295	[illegible]	[illegible]
[illegible]	F.S.	[illegible]	83	857	0	850	0	0	131,706	131,706	[illegible]	5 times
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

Table 47. - Costs of Nursery Sanitation, Michigan, 1934.

Nursery	Man-Days: Labor Amount	Man-Days: Labor Program	Man-Days: Supervision Amount	Man-Days: Supervision Program	Costs: Labor Amount	Costs: Labor Program	Costs: Supervision Amount	Costs: Supervision Program	Costs: Transp. Amount	Costs: Transp. Program	Total
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15.00	[illegible]	[illegible]	-	[illegible]
Chittenden	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]			[illegible]	[illegible]			[illegible]	[illegible]	
	[illegible]	[illegible]			[illegible]	[illegible]					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]				[illegible]		[illegible]		[illegible]		[illegible]

Table 45. - Summary, Nursery Sanitation, Michigan, 1929 to 1934.

Name and Location Federal State Private	Acres Protected	Working	Year Worked	Acres Worked	Cult. R.G. Pulled	Other Ribes Pulled	IECW	FS-ECW	Regular or BR-ERA	State	Owner	Total	[illegible]
Seal Nursery-FS	50	1st	1929	240	89	5,919	0	0	0	501.15	0	501.15	[illegible]
East Tawas		2nd	1932	240	0	1,808	0	0	35.89	0	38.40	74.29	[illegible]
		3rd	1933	210	0	110	0	0	0	6.75	0	6.75	1933
	60	4th	1934	360		3,110		314.50	0	0	0	314.50	
Sub-total				[illegible]	89	[illegible]	0	314.50	35.89	507.90	38.40	896.69	
Chittenden-FS Wellston	60	1st	1934	570	0	183,380	0	3,586.78	0	0	0	3,586.78	
Manistique-FS	55	1st	1933	305	0	58,490	531.00	709.77	0	0	0	1,240.77	
Manistique		2nd	1934	350	0	131,706		A 1,278.44	648.10	0	0	1,926.54	
Sub-total				[illegible]	0	190,196	531.00	1,988.21	648.10	0	0	[illegible]	
Dunbar-State	10	1st	1929	600	0	61,356	0	0	338.77	104.92	612.00	1,055.69	[illegible]
Chippewa Co.(old)		2nd	1930	160	0	45,240	0	0	0	214.14	585.33	[illegible]	[illegible]
Sub-total				600	0	106,595	0	0	338.77	[illegible]	1,1[illegible]	1,[illegible]	[illegible]
Dunbar-State	2	1st	1933	58	0	8,066	115.90	0	0	125.20	0	241.10	
(New Location)		2nd	1934	222	0	4,695	408.12	0	0	0	0	408.12	
Sub-total				222	0	12,261	524.02	0	0	125.20	0	649.22	
Roth-State	20	1st	1929	256	0	36,520	0	0	0	556.56	0	556.56	
Roscommon		2nd	1933	364	0	20,784	311.76	0	0	90.35	0	402.91	
Sub-total				364	0	57,304	311.76	0	0	[illegible]	0	[illegible]	
M.S.C.Nursery,State	20	1st	1929	240	43	453	0	0	0	230.02	0	230.02	
East Lansing		2nd	1931	40	0	56	0	0	5.85	[illegible]	0	[illegible]	
Sub-total				240	43	518	0	0	5.85	[illegible]	0	[illegible]	
Total 7 Nurseries. 167				[illegible]	[illegible]	309,547	1,[illegible]	5,691.49	1,[illegible]	1,681.41	1,288.79	11,[illegible]	

A. Includes $[illegible] - BR-ERA.

one a district supervisor and one a district black currant clean-up man, together with one State nursery inspector. The black currant clean-up man checked the counties when eradication of black currants had been completed. In some instances a few bushes were left and it was necessary for him to contact the owners and obtain the removal of the bushes. Under CWA several counties were only partially eradicated. These were completed by the black currant clean-up man as he worked over his territory.

The 1934 cultivated black currant eradication program is tabulated in Table 49.

In Table 50 the work from the time it was started in 1929 until the present is tabulated according to the counties in which the work was performed. Total costs of these campaigns are listed in Table 51.

Informational Activities

The principal medium for disseminating blister rust information this year in Michigan was by direct contact. The hundreds of Civilian Conservation Corps workers who were employed on control work this year were given literature and instruction on blister rust and its control. Talks were given by the state leader, agents and camp foremen in CCC camps and blister rust bulletins and posters placed on camp bulletin boards.

The expanded black currant eradication program, with the attendant newspaper publicity, as well as contacts with black currant owners, served to spread knowledge of blister rust widely. Contact with pine owners by men making pre-eradication surveys did the same. Signs along the road told travelers that "Blister Rust Crews are Working Here", and the resultant curiosity of the traveler caused many people to go in and obtain first-hand information about actual control work behind the crews.

Diamond-shaped posters, posted in conspicuous locations on protected areas, stating that "This Pine Lot Has Been Protected From Blister Rust by the Removal of Currant and Gooseberry Bushes" served not only to arouse the public's interest, but to bring to their attention the numerous areas we are protecting and the type of area which is being protected.

A blister rust exhibit was shown in the Upper Peninsula State Fair at Escanaba in connection with the State Department of Agriculture exhibit and others were shown at the Marquette County Fair and the fairs of Sault Ste Marie and Stalwart. The exhibit at Marquette was unique in that it was out of doors and shown in connection with a model CCC camp, which was also the regular blister rust side camp operating out of Big Bay Camp at Marquette. It was gratifying to note that these exhibits attracted wide attention and favorable comments.

A blister rust exhibit was shown at the Michigan State Fair at Detroit and the Western Michigan Horticultural Show at Grand Rapids. Both of these exhibits were largely attended and a considerable number of blister rust bulletins were passed out.

Table 51. - Summary and Costs of Cultivated Black Currant Eradication, Michigan, 1928 to 1934

Year	No. of Counties Completed	Black Currants Pulled: Locations	Black Currants Pulled: Bushes	Cost: Regular	Cost: NIRA	Cost: CWA	Cost: [illegible]	Cost: State	Cost: Total
Coop. Control	0	10	150	(Included in Cooperative Control)					
1929	5	684	2,698	$461.77	0	0	0	$6,000.87	$6,[illegible]
1930	6	1,[illegible]	19,729	0	0	0	0	11,476.97	11,476.97
1931	4	473	6,403	1,346.41	0	0	0	1,568.31	2,914.72
1932	4	290	5,170	763.70	0	0	0	2,356.41	3,120.11
1933	1	214	1,210	0	$377.77	$661.65	0	729.53	1,768.00
1934	27	8,030	57,028	0	13,5[illegible].03	9,957.35	$6,617.77	435.11	30,897.41
Total	47	9,1[illegible]	[illegible]	[illegible]	14,[illegible]	10,61[illegible]	6,617.77	22,[illegible]	[illegible]

Table 52. - Summary of Blister Rust Canker Pruning, Michigan, 1934

(Continuation of work started in December, 1933)

County	Location T	R	Sec.	No. Acres White Pine Treated	No. of Trees Treated	No. of Cankers Removed	Man-days Labor	CWA Total Cost	No. Trees Treated Per Acre	No. Cankers Pruned Per Acre	Cost Per Acre Treated	% Total Cost
Marquette	47N	26W	6	10	50	110	7	$40.50	5	15	$4.05	8.9
Marquette	47N	25W	6	18	40	120	4	24.00	2.2	6.6	1.33	5.3
Marquette	47N	26W	6	20	56	170	4	24.00	2.8	8.5	1.20	5.3
Marquette	47N	26W	6	15	65	260	6	36.00	4.3	17.3	2.40	8.0
Marquette	47N	26W	6	160	159	500	12.5	76.00	.99	3.1	.475	16.7
Marquette	47N	27W	7	50	36	60	2	12.00	.72	1.2	.24	2.6
Marquette	47N	27W	6-4-5-7-8-32-33	550	393	1,075	35	188.00	.71	1.9	.34	41.3
Marquette	47N	27W	8	25	30	605	4	20.80	1.2	24.2	.83	4.6
Marquette	(Along Highway U.S. 41W) (of Ishpeming to county line)			110	120	250	6	31.20	1.1	2.6	.28	6.8
Total				958	954	3,230	78.5	455.30	.99	3.3	.47	100

Educational Activities

To increase the efficiency of blister rust control work, a school of instruction was held in May in the Lower Peninsula and one in the Upper Peninsula. The schools were attended by all of the ECW checkers, and the camp foremen who were to have charge of the CCC laborers, NRA district supervisors and a few Nira county foremen.

The scene of the Lower Peninsula activities was Houghton Camp and of the Upper Peninsula Sturgeon River Camp. The school began on Thursday and continued until Sunday. Training was given the new men in eradication work under actual field conditions, supervised by the state leader and his assistants, the ECW checkers and the Nira district supervisors. The nights were devoted to classroom work and the matter of making out reports and other various office details were taken up and discussed by the state leader and assistant.

In the fall of 1934, after the close of the eradication season, a school of instruction was held for ECW mappers (ECW blister rust checkers) and Nira mappers (Nira district supervisors) on Saturday only regarding pre-eradication survey. In the Upper Peninsula the school was held at Escanaba, while in the Lower Peninsula it was held at Hartwick Pines Camp. The Lower Peninsula meeting assembled in the Administration Building belonging to the State Parks Division, Michigan Department of Conservation. The state leader presided and led discussion of field methods of mapping white pine. A short time was devoted to making office records. The balance of time (one half day) was given over to exchange of mapping data between mappers and the assignment to each mapper of a district.

Experimental Work

Late in the fall, after the pressure of conducting the regular control program had abated, infection studies were made of damage study plots in the Upper and Lower Peninsula. The work was conducted by men from the Milwaukee office assisted by agents from the Michigan personnel. Data was gathered from the following study plots in the Upper Peninsula; Deer Lake area in Dickinson County, Teal Lake area in Marquette County and Calumet area in Houghton County. The Deer Lake area in Dickinson County and the Teal Lake area in Marquette were fenced.

In Lower Michigan a study plot of blister rust on white pine at Leland on Lake Leland in Leelanau County was established. This area has been described under "Spread of Rust on White Pine".

All of the infection areas were laid out in definite plots, all pine trees were tagged, and then infection data was recorded of each tree tagged. These infection plots in addition to an area in Dickinson County and two areas in Marquette County will be used as demonstration areas so that the public may visit them and appreciate the seriousness of blister rust damage. They are so located as to be easily accessible.

Table 53. - State and Federal Expenditures for all Blister Rust Control Projects, Michigan, During Calendar Year, 19[illegible]

Agency	Expenditure classification	Supervision	B.R.C. agent activities	Ribes eradication	Nursery sanitation	Cult. black currant eradication	Field data: Pre-eradication survey	Field data: Checking	Field data: Other field data	Equipment and misc.	Total
State	Salaries	1,058.38	815.30	48.75		360.30					2,282.73
	Expenses	1,068.03	245.11	3.95		72.81	197.78	9.94		296.78	1,894.40
	Total	2,126.41	1,060.41	52.70		433.11	197.78	9.94		296.78	4,177.13
State ERA	Salaries		13.66	3,942.89		1,522.11	5.24				5,483.90
	Total		13.66	3,942.89		1,522.11	5.24				5,483.90
Fed ERA	Salaries		45.74	13,200.14		5,095.76	17.56				18,359.20
	Total		45.74	13,200.14		5,095.76	17.56				18,359.20
Reg. Fed	Salaries	630.00				60.48					690.48
	Expenses									139.42	139.42
	Total	630.00				60.48				139.42	829.90
NRA	Salaries	8,937.53	6,702.31	4,480.20	393.19	12,254.71	4,080.34	399.67	231.29		[illegible]
	Expenses	7,378.71	2,854.63	794.46	249.91	1,593.39	2,689.15	237.17	190.73		15,977.85
	Total	16,316.24	9,616.94	5,274.66	643.10	13,848.10	7,269.09	636.84	416.02		[illegible]
State ECW	Salaries		3,347.98	37,538.35	393.00		4,978.96	646.74			46,905.03
	Expenses		857.26	1,943.12	15.12		1,330.76	171.84			4,318.10
	Total		4,205.24	39,481.47	408.12		6,309.72	818.58			51,223.13
Park ECW	Salaries			3,574.38							3,574.38
	Expenses			30.50							30.50
	Total			3,604.88							3,604.88
For. Ser. ECW	Salaries		19.50	35,044.56	4,123.51		1,556.87	33.42			40,777.86
	Expenses		18.95	1,083.13	64.71		25.30	6.65			1,198.74
	Total		38.45	36,127.69	4,188.22		1,582.17	40.07			41,976.60
For. Ser. NRA	Salaries			28.60	983.50						1,012.10
	Expenses				10.00						10.00
	Total			28.60	993.50						1,022.10
Tech. ECW	Salaries		1,126.70				255.83	443.27			1,825.80
	Expenses		923.45				196.68	430.20			1,550.33
	Total		2,050.15				452.51	873.47			3,376.13
CWA	Salaries					9,937.35			453.30		10,390.65
	Total					9,937.35			453.30		10,390.65
Total	Salaries	4,6[illegible].21	14,131.19	97,257.67	5,[illegible]	29,230.71	11,898.40	1,[illegible].10	684.59		163,6[illegible]
	Expenses	9,[illegible].74	4,899.40	4,255.15	339.74	1,666.70	4,438.67	855.80	180.78	436.20	[illegible]
	Total	13,0[illegible]	17,030.59	101,712.82	5,[illegible].94	30,897.41	16,104.07	2,[illegible].50	865.32	436.20	188,766.11

Table 54. - Percent of Expenditures of Each Agency Spent on Each Activity, Michigan, 1934

Agency	Supervision	B.R.C. agent activities	Ribes eradication	Nursery sanitation	Cult. black currant eradication	Pre-eradication survey	Checking	Other field data	Equipment and misc.	Total
State	50.5	25.2	2.4		10.2	4.5	.2		7.0	100.0
State ERA		.2	71.9		27.8	.1				100.0
Fed. ERA		.2	71.9		27.7	.1				100.0
Regular	75.0				8.0				17.0	100.0
NRA	21.4	19.9	10.9	1.3	28.6	15.7	1.4	.8		100.0
State ECW		8.2	77.1	.8		12.3	1.6			100.0
Parks ECW			100.0							100.0
For. Ser. ECW		.1	86.1	10.0		3.7	.1			100.0
For. Ser. ERA			2.8	97.2						100.0
ECW Tech.		60.7				13.4	25.9			100.0
CWA					93.6			6.4		100.0
Total	5.3	7.0	58.[illegible]	3.5	15.[illegible]	3.5	1.2	.4	.5	100.0

Table 55. - Percent of Activity Costs Spent by Each Agency, Michigan, 1934

Agency	Super-vision	B.R.C. agent activities	Ribes eradi-cation	Nursery sanita-tion	Cult. B. Curr. and erad-ication	Pre-erad-ication Surveys	Checking	Other field data	Equip-ment & Misc.	Total
State	16.3	6.2	.1		1.4	1.2	.1		68.0	5.2
State ERA		.1	3.9		1.9	.1				2.9
Fed. ERA		.3	13.0		16.5	.1				9.7
Regular Fed.	4.8				.2				32.0	.1
NRA	78.9	56.4	5.2	10.4	44.8	46.9	26.8	47.6		25.7
State ECW		24.7	38.7	6.6		39.1	34.7			27.2
Parks ECW			3.5							1.9
For. Ser. ECW		.3	35.5	67.1		9.8	1.7			22.3
For. Ser. NRA			.1	15.9						.5
Tech. ECW		12.0				2.8	36.7			1.6
CWA					32.2			52.4		5.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.1

Canker Pruning

Two CWA men were employed in Marquette County for the purpose of removing infections from trees in protected areas. These trees had become infected before control measures were undertaken, and now that the danger of re-infection had been removed, it was deemed advisable to cut out the unsightly dead limbs. Results accomplished in this work are shown in Table 62.

Costs

In Table 63 all expenditures made in Michigan in the control of white pine blister rust are tabulated according to the agency participating, the expenditure classification and the type of control work performed. In Table 64 these funds are shown as percentages with reference to the total expenditure for a given agency. In Table 65 the same expenditures are listed as percentages of the total expenditure incurred against a particular project.

It will be noted that the State and BPI funds were given mainly to supervision, whereas expenditures for CWA, MERA, FS-CCC, Parks CCC and ECW were given mainly to the hiring of laborers for Ribes eradication. Only seven percent of all funds involved were used for supervision.

In comparing ECW costs of Michigan with other states of the region (excepting Indiana) let it be remembered that the CCC man day in this state is evaluated at $1.00, whereas in other states the man day is evaluated on the basis of $5.00.

Approximately 97% of all funds involved in the Michigan program were relief of one kind or another.

Conclusion

In the 1934 Michigan blister rust control program two facts were convincingly demonstrated — (1) blister rust control work is an excellent project on which to employ large numbers of men on relief, because of the minimum amount of equipment necessary and the high proportion of men who can be trained to do the work; and (2) given adequate supervision effective control work at a low cost can be accomplished. The fact was stressed to the relief workers that the work was not simply made work, but was part of a program started prior to the depression to save white pine stands from blister rust damage and was entirely worth while. The men for the most part responded to this viewpoint, became interested and did excellent work.

During 1934 several new pine infection centers were found, particularly in Lower Michigan and an ever increasing amount of damage was found in known infection areas. A large number of young cankers were discovered, giving evidence of the constantly increasing amount of infection.

Among the several control accomplishments during the year, two merit special mention.

(1) Of the total of [illegible] acres eradicated of Ribes from [illegible] to 1948, [illegible] acres, or [illegible]%, were worked in 1948. To date [illegible] acres of white pine, or [illegible]% of the total, have been given initial protection.

(2) To date a total of 90,246 cultivated black currants found in [illegible] locations have been destroyed. Cultivated black currant elimination is completed in 47 white pine counties and partially completed in eleven more.

Large strides have been taken toward the goal of protecting [illegible] valuable young white pine stands against blister rust and it is hoped that this work may continue on an adequate scale until the goal is reached.

BLISTER RUST CONTROL, WISCONSIN, 1933

History of the Work

Blister rust was first found in the State by Mr. [illegible] at Amery (Polk County) in 1916. This infection was on imported white pines.

Little state official effort was made to control the disease until in 1918 when the State Legislature appropriated $7,500. This amount was appropriated during each of the two succeeding fiscal years and cut to $4,000 for the years of 1921, 1922 and 1923. After 1923 no legislative appropriations were made except those through the Wisconsin Department of Agriculture and the Conservation Department. A limited amount of funds were set aside from 1918 to 1930 by the Federal Government.

In 1930 a definite white pine blister rust control program was adopted and a permanent state supervisor was appointed to direct all control activities in the State. During 1930 and 1931 a slight increase in cooperative funds was available. During 1932 a somewhat greater increase in funds was made by State and Federal departments as well as from individual white pine cooperators. The 1933 program took on added proportions with funds appropriated by the Wisconsin Department of Agriculture and Markets, by the Wisconsin Conservation Department, by the Federal Civil Works Administration, by the Federal Emergency Conservation Work program, and by the National Recovery Administration through the Division of Plant Disease Control of the U.S. Department of Agriculture.

Organization

In 1915 when State and Federal officials learned that white pine blister rust existed in a pine stand near Amery, Wisconsin, in Polk County, they immediately made an attempt to exterminate the disease by cutting and burning all white pines and Ribes in the immediate vicinity. This attempt proved futile, however, for in 1917 and 1918 a survey of pine stands in adjoining counties disclosed that the rust from Polk County already had spread to other counties. This confirmed the suspicion that white pine blister rust could not be exterminated in Wisconsin but that it would have to be controlled. Therefore, beginning with the autumn of 1918 all effort was placed on disease control through work with the host plant Ribes rather than on continuing the early attempt to eradicate the disease itself. The method of control adopted by State and Federal officials was removal of the alternate plant host, the Ribes bush. This method proved very successful, and it is still the key to the control of this serious plant disease.

During the period 1920 to 1931, inclusive, systematic Ribes eradication was conducted on approximately 25,430 acres. In 1932 there were 12,712 acres initially worked. During 1933 approximately 58,[illegible]

[illegible] were cleared of Ribes on cooperative control projects. Ribes bushes are pulled up by hand, consequently, blister rust control has proven itself an ideal type of work for relief labor.

Blister rust control work is performed under the Memorandum of Understanding between the U. S. Department of Agriculture and the State departments concerned, shown following.

"MEMORANDUM OF UNDERSTANDING BETWEEN THE UNITED STATES DEPARTMENT OF AGRICULTURE AND MARKETS, DIVISION OF INSECT AND PLANT DISEASE CONTROL, AND THE WISCONSIN CONSERVATION COMMISSION, DIVISION OF FORESTRY AND PARKS

Cooperative Work in Controlling White Pine Blister Rust in Wisconsin

"The object of the cooperative work outlined herein is to provide for accomplishing control of the white pine blister rust in Wisconsin.

"A. The United States Department of Agriculture, Bureau of Plant Industry will

(1) Arrange for the payment of the salaries and necessary travel expenses of one or more employees who shall conduct cooperative blister rust control work in Wisconsin.

(2) Provide these employees with subject matter and technical information essential to the proper conduct of their work.

(3) Conduct experiments and demonstrations for the purpose of improving control practices.

(4) Obtain data on the spread of the rust, the interstate movement of host plants and the conditions under which they are grown commercially, to supplement Federal blister rust quarantines in promoting the effective prosecution of the cooperative control work.

(5) Coordinate blister rust control activities in the several cooperating states by furnishing regional leadership and supervision.

"B. The Wisconsin Department of Agriculture and Markets, Division of Insect and Plant Disease Control will

(1) Assume the administrative direction of the aforesaid employees of the United States Bureau of Plant Industry.

(2) Conduct such control activities as may be agreed upon each year by the cooperating parties and cooperate with counties, townships, associations, individuals, and other pine owners in the application of local control measures on a basis satisfactory to the parties to this agreement.

(3) Provide such supervision and checking of local eradication of Ribes as will assure the thorough removal of these plants.

(4) Undertake such destruction of white pine or Ribes in Wisconsin and such enforcement of State laws as may be necessary for the effective prosecution of blister rust control work.

(5) Prepare an annual report of all blister rust control work performed under the provisions of this memorandum, one copy of which will be delivered to each of the cooperating parties.

(6) Submit in prescribed form to the United States Bureau of Plant Industry a monthly report of salaries and expenses paid by the State on blister rust control work.

(7) Have all salary and expense vouchers to be paid out of Federal funds approved by the man directly in charge of supervising cooperative blister rust control work in the State before being submitted to the United States Bureau of Plant Industry for payment.

C. The Wisconsin Conservation Commission Will

(1) Cooperate in the application of local control measures on state owned lands and other lands under state supervision.

(2) Make available the facilities of its organization and personnel in so far as practicable for assisting in the control of white pine blister rust.

D. It is Mutually Agreed

(1) That the several undertakings of this memorandum shall become effective July 1, 1930, and continue in force until terminated at the option of either party by a written statement to that effect.

(2) That the cooperative plan of work outlined in this memorandum will best accomplish control of white pine blister rust in Wisconsin.

(3) That all persons appointed by the United States Bureau of Plant Industry and its cooperators under this memorandum shall be satisfactory to the cooperating parties.

(4) That the results of the cooperative work may be published jointly, or upon mutual agreement, by either cooperating party, with due credit given to the cooperating agencies. Copies of all manuscripts therefore, shall be furnished the cooperating parties before publication, and all form letters, bulletins and any other circulars to be mailed in penalty envelopes shall be submitted in manuscript form for approval by the United States Department of Agriculture before being printed or sent out.

(5) That any expenditures involved in the work herein assumed by the United States Bureau of Plant Industry are contingent upon appropriations being made therefore by Congress, but no Federal funds shall be expended in compensation for [illegible] plants destroyed in control work.

(6) That for the fiscal year July 1, 1930, to June 30, 1931, the

Wisconsin Department of Agriculture and Markets, Division of Insect and Plant Disease Control, and its cooperators will expend about $1,750.00; The Wisconsin Conservation Commission and its cooperators about $1,250.00, and the Federal Government in behalf of the United States Bureau of Plant Industry about $3,000.00 in connection with the work herein provided for. A copy of this agreement shall be sent to each of the signatories hereto.

In witness whereof the parties hereto have hereunto signed these presents on the respective days and dates hereinafter set forth.

March 25, 1930 — (S) Charles L. Hill
Commissioner, Wisconsin Department of Agriculture and Markets

April 3, 1930 — (S) Paul D. Kelleter
Director, Wisconsin Conservation Commission

June 27, 1930 — (S) W. A. Taylor
Chief, Bureau of Plant Industry, United States Department of Agriculture

Approved: June 28, 1930

(S) A. F. Woods
Director of Scientific Work

AMENDMENT TO MEMORANDUM OF UNDERSTANDING
Effective July 1, 1933
between

Amendment No. 1
Washington, D.C.

THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF ENTOMOLOGY, THE WISCONSIN DEPARTMENT OF AGRICULTURE AND MARKETS, DIVISION OF INSECT AND PLANT DISEASE CONTROL, AND THE WISCONSIN CONSERVATION DEPARTMENT

Cooperative Work in Controlling White Pine Blister Rust in Wisconsin

Whereas,

The said cooperative work in controlling white pine blister rust in Wisconsin has, by reorganization within the Department of Agriculture, been transferred to the Bureau of Entomology of said Department,

Now, therefore, in accordance with the foregoing provision and pursuant to such reorganization it is mutually agreed that the Memorandum of Understanding described above is hereby amended by the following paragraph providing funds to be expended during the fiscal year July 1, 1934, to June 30, 1935.

It is mutually agreed that for the fiscal year ending June 30, 1935, there will be expended by the Wisconsin State Department

of Agriculture, Division of Forest Pest [illegible] Control and its cooperators, about $[illegible] and by the Wisconsin Conservation Department, about $[illegible], and by the Federal Government on behalf of the [illegible], Bureau of Entomology, about $[illegible] in connection with the work herein provided for, provided, however, that the maximum expended by the Federal Government shall not exceed $[illegible].

[illegible], 1953	(s) [illegible]
	Commissioner, Wisconsin State Department of Agriculture
June [illegible], 1953	(s) [illegible]
	Director, Wisconsin Conservation Department
July [illegible], 1953	(s) [illegible]
	Chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture

Control work is supervised by a technical staff [illegible] and [illegible] furnished by the U. S. Department of Agriculture. The latter works under the immediate supervision of the State Entomologist. Effective July 1, 1954, responsibility for the direction of Federal blister rust control activities was transferred from the Division of Blister Rust Control of the Bureau of Plant Industry to the Division of Plant Disease Control of the Bureau of Entomology and Plant Quarantine.

During 1954 blister rust control work in Wisconsin was performed with funds from the following agencies:

Wisconsin Dept. of Agriculture and Markets	[illegible]
Wisconsin Conservation Department	[illegible]
Wisconsin Forest Crop Law	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

[illegible] Cooperative [illegible], as conducted by:
Wisconsin Conservation Department
[illegible]
U. S. Indian Service

Activities in blister rust control work during 1954 were as follows:

[illegible] white pine blister rust	[illegible]
[illegible] white pine [illegible]	[illegible]
[illegible]	[illegible]
[illegible] control	[illegible]
[illegible] of control work	[illegible]

The Wisconsin Conservation Department cooperated by making its personnel [illegible] to assist with control work in general. In addition, [illegible] have [illegible] funds for blister rust control in [illegible] pines and [illegible].

The United States Department of Agriculture, through the Division of Plant Disease Control of the Bureau of Entomology and Plant Quarantine, assumes responsibility for blister rust control leadership and for supervision of informational and service work in the State.

The State Supervisor is directly responsible for all control work in Wisconsin and is accountable for its general plans. He organizes and directs the activities of the public blister rust personnel and must maintain adequate field and office records of the work performed.

The supplementary personnel, together with the individuals' duties, in Wisconsin, is shown in Table 96.

Status of the Rust

Since 1915 when the first infection center was discovered in Polk County the rust has spread throughout nearly the entire white pine growing region in the State. It is now hopeless to expect a white pine stand to survive to commercial maturity if Ribes bushes are permitted to grow within infecting range of the trees. Up to December 31, 1934, rust, either on pine or Ribes, or both, has been found in a total of 40 counties in Wisconsin, 27 of which has infection on both pines and Ribes.

The present status of infection in Wisconsin counties, classified according to year infection was first found, is summarized in Table 97.

No special funds were devoted to scouting for the disease in Wisconsin during 1934. Nevertheless, new infections were discovered in connection with pre-eradication surveys and Ribes eradication work in counties in which infection had been unknown heretofore. Furthermore, many new infection centers were located in counties where blister rust had been previously reported, denoting greater intensification of the disease.

During 1934 pine infections were found for the first time in six counties -- Adams, Jackson, Lincoln, Marathon, Oneida and Taylor; Ribes infections were found for the first time in Price County. Details of these new infections are as follows:

Infections Found in New Counties During 1934

(a) On White Pine

1. Adams County -- Spot infection discovered in T18N R6E Sec. 21, [illegible], by CCC Foreman H. R. [illegible], on August 28, 1934. Ribes infection was also found in Adams County for the first time.

2. Jackson County -- Spot infection found in T23N R4W Sec. 30, by CCC Foreman John Roe, on August 20, 1934.

3. Lincoln County -- Spot infection discovered in T31N R6E Sec. 9, [illegible], by FERA Crew Foreman Leonard [illegible], on September 12, 1934.

Table 3. - Approximate number of employees, [illegible] ... sharing of duties, Dutch Elm Disease Control, Wisconsin, 1934.

Program	Position	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Man Months	Duties
U.S.	State Leader	1	1	1	1	1	1	1	1	1	1	1	1	12	In charge of all U.S. work in the state.
	District Agents	2	3	3	2	3	5	3	[illegible]	[illegible]	2	2	2	32	[illegible]
	Supervisors	1	2	1	1	2	7	3	[illegible]	[illegible]	[illegible]	3	2	42	[illegible] surveys.
	Laborers							10	[illegible]					50	[illegible]
	Sub-total	5	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]			[illegible]	[illegible]		[illegible]	
FS-CWA	Foremen					1	1	2						8	The foremen [illegible] the laborers [illegible] crew.
	Laborers					17	[illegible]	12						45	
	Sub-total					[illegible]	[illegible]	[illegible]						[illegible]	
FS-ECW	Technician	1	1	1	1	1	1	1	[illegible]		[illegible]	1	1	12	[illegible]
	Checker					1	2	[illegible]						8	[illegible] the foremen.
(#)	Tech. Foremen					10	[illegible]	[illegible]						55	[illegible]
	CCC Laborers					50	100	100						487	
	Sub-total	1	1	1	1	59	[illegible]	[illegible]				1	[illegible]	[illegible]	
State ECW	Checkers	4	4	4	4	4	4	4				5	4	47	[illegible]
	Foremen	10	10	10	10	10	10	10	[illegible]		[illegible]	11	10	124	[illegible]
	CCC Laborers	65	26	45	11	276	190	117	[illegible]			15	12	1042	[illegible]
	Sub-total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	
SS-ECW	Manager					2	2	[illegible]						10	[illegible]
	Rangers					5	5	[illegible]						35	[illegible]
	Checkers					1	1	1	[illegible]					9	[illegible]
	Foremen					7	9	9						55	[illegible]
	Laborers					65	[illegible]	158						795	[illegible]
	Sub-total					[illegible]	[illegible]	[illegible]						[illegible]	
CWA	Foremen	10	10	10										30	[illegible]
	Laborers	30	[illegible]	30										90	
	Sub-total	40	[illegible]	40										110	
State	Foremen					10	10	10	[illegible]			1		[illegible]	[illegible]
	Laborers							[illegible]	[illegible]					66	[illegible]
	Sub-total					[illegible]	10	[illegible]				1		[illegible]	
FERA	Laborers					56	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	1028	[illegible]
All Programs	State Leader	1	1	1	1	1	1	1	[illegible]			1	1	12	
	Dist. Agents	2	3	3	2	3	5	3				[illegible]	2	32	
	Supervisors	6	[illegible]	[illegible]	5	16	20	[illegible]			[illegible]	[illegible]	7	141	
	Foremen	40	20	20	20	[illegible]	[illegible]	[illegible]			[illegible]	12	10	380	
	Laborers	95	[illegible]	55	11	602	749	1078	[illegible]		[illegible]	[illegible]	[illegible]	5084	
	Grand Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	

(*) [illegible] engaged in [illegible] [illegible] [illegible].
(#) Part time only.

Table [illegible] - Present Status of Infection in Wisconsin Counties Classified According to Year Infection was First Found.

Found	County	Ribes Infect. Only	Ribes and Pine Infection. Year Pine Infection First Found '15	'16	'19	'20	'26	'30	'31	'32	'33	'34	Total Counties
1915	Polk		X										1
1916	Burnett			X									
	Clark							X					
	Dunn						X						
	Marathon											X	
	Pepin								X				
	Pierce								X				
	Rusk	X											
	Shawano					X							
	St. Croix				X								
	Washburn										X		
	Barron			X									11
1919	Chippewa								X				1
1920	Sawyer					X							1
1926	Waupaca								X				1
1929	Florence	X											
	Forest										X		2
1930	Douglas							X					
	Eau Claire	X											2
1931	Dane	X											
	Jackson											X	
	Oconto								X				3
1932	Ashland										X		
	Brown	X											
	Door	X											
	Grant	X											
	Kewaunee	X											
	La Crosse	X											
	Lincoln											X	
	Marinette	X											
	Portage										X		
	Vernon									X			
	Wood									X			11
1933	Bayfield										X		
	Langlade	X											
	Oneida											X	
	Vilas	X											4
1934	Adams											X	
	Price	X											
	Taylor											X	3
Total -- 40		13	1	2	1	2	1	2	5	2	5	6	40

5. Marathon County — Spot infection observed in T28N R7E Sec. [illegible], [illegible], by State Foreman Fenton Mitchell, on August 21, 1934.

6. Oneida County — Spot infection found in T36N R8E Sec. 26, SE-NE, by ECW Foreman C. O. [illegible], on January 17, 1935.

7. Taylor County — Spot infection discovered in T32N R2W Sec. 10, [illegible] and [illegible]-NW. General infection found in the same township in Sec. [illegible], NE-NW, and Sec. 13, [illegible], by Agent Darrel Closson, on March 1, 1934. Spot infection observed in T30N R2W Sec. 2[illegible], NE-NW and in T30N R2W Sec. 31, SW-SW, and general infection in T30N R2W Sec. 32, [illegible], by Agent Darrel Closson, on March 8 and 9, 1934.

(b) On Ribes Only

1. Price County — Infection found on four of 15 *Ribes cynosbati* bushes examined and on seven of eight *Ribes glandulosum* bushes examined in T40N R1E Sec. 31, Gov. Lot 11. Location in and surrounding gravel pit on west side of road approximately two miles south of Park Falls, Wisconsin, on State Highway No. 13. Discovered by Agent T. F. [illegible] on August 17, 1934.

White Pine Acreage

The best available estimate of white pine in Wisconsin, based chiefly on data from the white pine inventory in Wisconsin and from surveys made by the blister rust supervisory personnel under State, ERA, CWA, and ECW funds shows approximately 511,710 acres of well-stocked and medium stocked white pine and 274,250 acres of poorly-stocked white pine. In addition to this vast area there are some 723,000 acres of white pine too scattered to protect or even map. Nevertheless, the trees possess considerable value from the seed dissemination standpoint in addition to their aesthetic and commercial value. Table 26 lists the acreage of white pine in Wisconsin by counties and ownership classes.

The location and extent of white pine areas plus the data pertaining to the abundance of Ribes on such areas are necessary to plan intelligently and to execute effectively a large scale Ribes eradication program. During the late fall and winter months all effort has been devoted to this work. Data collected in a pre-eradication survey consist of (1) locating and mapping the white pine, including well-stocked, medium-stocked and poorly-stocked stands, (2) cruising the areas requiring crew work and scout work, and (3) making an estimate of the man days of labor required to do the Ribes eradication.

Whether or not a pine stand is considered of sufficient value to warrant the cost of protection depends chiefly upon the size of the stand, number of trees per acre and their size, and the use and value of such trees to the owner and the community. Accordingly, in a pre-eradication survey certain classifications of white pine stands are necessary. The following table lists the requirements for each of these pine classifications as used in the Wisconsin pre-eradication survey:

Table 5a. – [illegible]

County	Acres Fully-Stocked and Fully-Stocked Stands: County & Private	State	Federal Forests	Indian Lands	Total	Acres Poorly-Stocked Stands: County & Private	State	Federal Forests	Other Lands	Total
Adams	4,500				4,500	2,000				[illegible]
Ashland	4,500	200	800	2,500	8,000	4,100	500	500	1,000	[illegible]
Barron	5,500				5,500	5,000				[illegible]
Bayfield	5,500	800	4,000	100	10,500	6,400	500	7,100	100	[illegible]
[illegible]	1,950	50			2,000	2,000				[illegible]
[illegible]	500				500	500				[illegible]
[illegible]	4,500				4,500	1,500				[illegible]
Chippewa	7,000	[illegible]			7,000	2,000	500			[illegible]
Clark	4,000				4,000	1,500				[illegible]
Columbia	2,500				2,500	2,000				[illegible]
[illegible]	450	50			500	1,500				[illegible]
Door	1,500	500			2,000	1,100	400			[illegible]
Douglas	3,500	500			4,000	5,000	500			[illegible]
Dunn	3,900	100			4,000	2,900	100			[illegible]
Eau Claire	3,000				3,000	2,000				[illegible]
Florence	4,600	400			5,000	1,500	500			[illegible]
Forest	4,100	100	500		7,000	7,100	500	[illegible]		[illegible]
Green Lake	800				800	1,000				[illegible]
Iron	3,100	[illegible]		500	4,000	1,100	500		100	[illegible]
Jackson	4,000	500			5,500	[illegible]	500			[illegible]
[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]			[illegible]
[illegible]	[illegible]				[illegible]	[illegible]				[illegible]
[illegible]	[illegible]				[illegible]	[illegible]				[illegible]
[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]			[illegible]
[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]			[illegible]
[illegible]	[illegible]				[illegible]	[illegible]				[illegible]
[illegible]	[illegible]				[illegible]	[illegible]				[illegible]
[illegible]	[illegible]				[illegible]	[illegible]				[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]			[illegible]
[illegible]	[illegible]				[illegible]	[illegible]				[illegible]
[illegible]	[illegible]				[illegible]	[illegible]				[illegible]
[illegible]	1,100				1,100	1,500				[illegible]
[illegible]	1,000				1,000	1,500				[illegible]
Polk	6,250	750			7,000	5,500	500			[illegible]
Portage	7,000				7,000	3,000				[illegible]
Price	6,500	100	4,400		11,000	4,500	100	800		[illegible]
Rusk	7,000	100			7,000	7,000	400			[illegible]
Sauk	7,100	400			7,500	7,100	500			[illegible]
Sawyer	17,750	150	1,000	1,100	20,000	13,000	500	100	200	[illegible]
Shawano	10,000			1,500	11,500	4,100			10,000	[illegible]
Sheboygan	7,400	100			7,500	1,500	500			[illegible]
St. Croix	6,000				6,000	2,000				[illegible]
Taylor	1,800	100			1,900	1,200	100			[illegible]
Trempealeau	250	50			300	450	50			[illegible]
Vilas	20,000	1,000	800	2,100	24,000	11,000	10,000	100	1,000	[illegible]
Washburn	5,000				5,000	4,000				[illegible]
[illegible]	7,000				7,000	4,000				[illegible]
[illegible]	6,900	100			7,000	3,000	500			[illegible]
[illegible]	2,100				2,100	1,000				[illegible]
Wood	5,400	100			5,500	5,000	500			[illegible]
[illegible]										
[illegible]	1,150	100			1,250	1,000	200			[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]
[illegible]
[illegible]

Pine Stand	Minimum Stocking	Minimum Block [illegible]
(1) Well-stocked and Medium-stocked	1-6 ft. high, 200 trees per A. 7-15 ft. high, 100 trees per A. 16 ft. high or over, 50 trees per A.	Forest conditions - 20 acres Woodlots - 5 acres Shelterbelts - 10 trees Ornamental - Any size
(2) Poorly-stocked	1-6 ft. high, 20 trees per A. 7-15 ft. high, 10 trees per A. 16 ft. high or over, 5 trees per A.	Forest conditions - [illegible]
(3) Scattered	Not meeting poorly-stocked pine [illegible] mapped requirements.	

There appears to be a close correlation between the forest flora of a given locality and the Ribes species and their abundance within this locality. Due to this correlation a known forest association indicates the presence of a definite Ribes type. This knowledge is especially helpful when work on the eradication survey is being done during winter months and the ground flora [illegible] of the Ribes are completely covered with snow. Letters of the alphabet are placed on the preeradication survey field maps by the mapper to indicate the Ribes types present.

Pre-eradication survey work was conducted in conjunction with white pine mapping. With the close of the Ribes eradication work some of the supervisory personnel were retained to do white pine mapping and Ribes pre-eradication survey work in preparation for the 1935 season. This work was done with funds furnished by the State, CWA, ERA and CCC. The CCC forces concentrated on the pine areas within the 15-mile radii of CCC camps and the CWA, ERA and State funds were utilized to map those pine areas not accessible to the CCC personnel. The CCC foremen have completed, or nearly completed, this work in the following counties: Adams, Bayfield, Burnett, Clark, Douglas, Eau Claire, Florence, Forest, Iron, Jackson, Juneau, Langlade, Lincoln, Marinette, Oneida, Price, Sawyer, Vilas and Wood. The U. S. Forest Service CCC forces completed portions of the Chequamegon and Nicolet National Forests, while the U. S. Indian Service CCC personnel mapped the entire Lac du Flambeau and Lac Courte Oreilles Indian Reservations, a large portion of the Menominee Reservation, and mapping is now being done on the Bad River Indian Reservation. The National Recovery Administration supplied funds for mapping Polk, Shawano, Taylor and Waushara counties. Under the CWA many unemployed men were given winter work mapping white pine stands. This pine survey project began prior to most other CWA projects in Wisconsin and for this reason a surprising number of well qualified men were secured from the unemployed rolls. In almost every case some men with forestry or engineering training collected the field data.

Up to March 22, 1934, when the project terminated, pine mapping work was done by CWA workers in Ashland, Chippewa, Dunn, Green Lake, Manitowoc, Marathon, Monroe, Outagamie, Portage, Sheboygan, Washburn, Waupaca, and

Ribes Types

Type	Character	Ribes species	Ribes [illegible]
A Swamp type, [illegible] woods, alder, tamarack, black spruce	Water usually standing, deep humus, loamy soil, much brush, windfalls, cedar, hardwoods, white pine scattering. A difficult, costly eradication job usually. Crew work. [illegible] formation.	americanum triste hudsonianum glandulosum cynosbati oxyacanthoides hirtellum missouriense	Heavy
B Swamp type, muskeg	Water still, deep peat, dense growth, leather leaf, moss, scattered dwarf black spruce. Scout or crew work on edges only.	glandulosum	Few [illegible] edges
C Upland type, hardwoods, white pine	Dry land, medium soil, sandy loam to clay loam, good soils. Brush medium. Mixed hardwoods, white pine; open aspen-birch-white pine. Good white pine planting sites. Crew work.	hirtellum cynosbati oxyacanthoides triste	None to medium
D Upland type, pine	Dry land, sand to sandy loam. Brush light. Jack pine, Norway pine, white pine. Usually scout work.	triste cynosbati hirtellum	None to few
E Upland type, pasture	Dry land, open fields, pastures. Soils vary. Scattered hardwoods, white pine. Scout or crew work.	cynosbati hirtellum americanum missouriense	Few to medium. Often large bushes
F Cultivated	Ribes in crops or meadow not much [illegible], area scout work except along fences, stone piles, etc.	None	None

[illegible] counties. The total acres of white pine covered by pre-eradication surveys are shown in Table 59.

Table 59. - White Pine Location and Pre-eradication Survey, Listed by Agencies, Wisconsin, 1934
(Includes acres of well-stocked and medium-stocked pine [illegible])

State ECW	Forest Service ECW	Indian Service ECW	NRA	Wis. Dept. Agric. and Markets	CWA	Total
42,795	11,847	9,850	1,108	2,038	27,840	103,477

In Table 60 there is listed the costs incurred in Wisconsin [illegible] the 1934 pre-eradication surveys.

Local Control

Local control of white pine blister rust refers to the removal of the Ribes bushes within infecting range of white pine stands. A distance of 900 feet has been found sufficient for all Ribes bushes except cultivated black currants, one mile being the distance for the latter. Protection of pine stands against blister rust attack in the past depended largely upon the cooperation of the individual pine owners who furnished the labor necessary to eradicate the Ribes bushes, while the State or Federal agencies supplied the supervision at no cost to the owner. Since 1932 few owners have felt financially able to stand the expense of protecting their pine stands. At this point welfare agencies began to supply labor listed on their relief rolls since pine stands, regardless of ownership, were considered an asset to the entire community. Sufficient labor, therefore, was easily obtainable if State or Federal departments could furnish the foremen to supervise these relief workers. Near the latter part of the 1933 Ribes eradication season $50,000 was made available by the National Recovery Administration for blister rust control work in Wisconsin. This sum was made available to June 30, 1935.

During 1934 Ribes eradication work in Wisconsin was done by funds from local, State and Federal agencies. This included cooperation from individual pine owners, towns and counties and funds from the Wisconsin Department of Agriculture and Markets, the Wisconsin Conservation Department, the National Recovery Administration, the Federal Emergency Relief Administration, the Wisconsin ECW, the U.S. Forest Service ECW, and the U.S. Indian Service ECW.

Federal Emergency Relief Administration

A blister rust control project using FERA labor was begun in [illegible] County on May 23, 1934, and proved to be successful to such an extent that it was immediately tried in other counties as well. Supervision in [illegible] County was supplied by the Wisconsin Department of Agriculture and Markets while labor and transportation were furnished by the pine owners and by funds from towns, county and the Federal Emergency Relief Administration.

Table 50. - Summary of White Pine Location and Pre-eradication Survey Costs, Wisconsin, 1934.

Program	Salaries of Supervision and Labor					Expenses (Including Subsistence and Transportation)				Total Salaries & Expenses
	CWA	ECW	NRA	State	Total	ECW	NRA	State	Total	
State ECW		10,629.11			10,629.11	1,778.63			1,778.63	12,407.74
Forest Serv.		798.61			798.61	254.77			254.77	1,053.[illegible]
Indian Serv.		2,086.49	506.96	108.23	2,[illegible].66	500.65	229.42	41.41	771.68	[illegible]
NRA			1,633.31		1,633.31		1,197.09		1,197.09	[illegible]
Wis.Dept.Agr. & Markets				399.52	399.52			179.95	179.95	579.47
CWA	7,401.49				7,401.49					7,401.49
Totals	7,401.49	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Plans similar to those set up in Shawano County were submitted to and approved by county officials and FERA representatives in Door, Douglas, Lincoln, Marathon, Marinette, Monroe, Polk, Portage, Washburn and Wood counties. Supervision and transportation for supervision was furnished chiefly by the Wisconsin Department of Agriculture and Markets in Douglas, Marathon, Monroe, Polk, Portage, Washburn and Wood counties. The National Recovery Administration furnished supervision chiefly in Door, Lincoln and Marinette counties and transportation for labor and supervision in all counties except Marinette where transportation was supplied by Wisconsin Forest Crop Law funds. Each county, except Douglas, supplied a portion of the funds for labor, and the remainder was paid by the FERA. The exact percentage of funds a county furnished depended upon its financial status. The FERA blister rust control work in Wisconsin made it possible to employ approximately 550 men taken from county and municipal relief rolls.

Certain phases of the work were common to all the counties in which FERA labor was used. For instance, organizing the project, assigning and training the crews, and arranging for their transportation to and from work.

This project was suitable to those counties on the county-unit system of relief only. The project was set up with the local FERA Work Secretary. A requisition was made for FERA labor, based on estimates from the pre-eradication survey made previously. The approval committee on FERA projects in each county consisted of the chairman of the county board, the agricultural agent, the highway commissioner and the relief director. Local units supplied a portion of the labor cost, usually from 15 to 33-1/3 percent; therefore, county sanction was necessary before the project was considered for approval by State FERA officials at Madison. When final approval was received from the Madison FERA office, the state foreman or Federal agent who was assigned to the project began the details of making out assignment cards for the workers and arranging specific days for the men to work so that a continuous crew could be obtained, since these relief men were merely allowed to work out their budgetary requirements, which oftentimes totaled only 10 or 12 days per month. An FERA crew foreman for each crew was chosen by the state blister rust foreman in charge of the work in the county. Because of added responsibility, a crew foreman received 10 cents an hour above the general rate of pay, and in addition he was permitted to have a larger budget to work out.

When FERA laborers lived within walking distance of their jobs they were responsible for their own transportation. In some counties, for example in Shawano County, a five-ton truck was loaned by the county highway department to transport blister rust crews to and from work. The various political towns in which control work was performed paid for the operating expenses of the truck. The truck usually made two round trips each day; consequently, it was possible to haul large crews with one truck. In counties where no trucks were obtainable from cooperative sources bids were taken from local truck owners by the U. S. Bureau of Entomology and Plant Quarantine, to be paid for from FERA funds. These trucks had to operate under the State trucking law and in addition they had to meet the special requirements as outlined in the Federal Trucking Code. The lowest bid was accepted in every instance. The accepted bid

ranged from 14 to 18 cents per mile. Relief workers assigned to blister rust control work in a county were instructed to congregate at a central station, from which point trucks could collect them in a group. In counties where FERA men were not concentrated the use of large trucks was impractical, and personal cars hired at five cents per mile were used. These cars would usually carry from five to seven men. Ordinarily the crew-foreman of the crew transported his own men to and from work at the five cents per mile rate.

FERA crews usually consisted of 10 men in line — two FERA checkers behind the line and a FERA crew foreman behind the checkers who was in immediate charge of the crew under the county foreman. These large crews kept the number of working units within a county at a minimum, thus permitting the county foreman to supervise his crews more closely.

Relief men were, almost without exception, from villages or rural communities; consequently, they were familiar with the woods and in a few days' training could recognize the Ribes species common to their locality. Since the FERA men used on the blister rust control project were usually between 20 and 50 years of age, they ordinarily took the work seriously and could actually be depended upon to report for work according to their assignments. On the other hand, it was unusual for an FERA crew foreman to reason problems out for himself. All systematic checking of areas worked by crews was performed either by the county foreman or by a federal agent. On the whole, the quality of the work was good and compared favorably with that of other relief agencies. This project must have experienced state foremen or federal agents to supervise the work who can take full responsibility for its thoroughness. Tables 61 and 62 list the work performed by FERA crews during 1934.

State Parks

Blister rust control work progressed in two state parks during 1934 — the Interstate Park in Polk County and the Potawatomi State Park in Door County. Each of these parks possesses white pine stands of high aesthetic value.

The white pine in Interstate Park is located principally along the high, rocky ridges overlooking the valley of the St. Croix River. White pine blister rust was found in the park in 1919, but timely Ribes eradication has since kept the pines free of infection. Ribes were eradicated from the park in 1920, and a portion of it was re-examined for bushes in 1931. The entire park was worked for the second time during 1934. One evidence of the possibilities in controlling white pine blister rust is displayed in Interstate Park located in the county in which blister rust was first discovered in Wisconsin. During the Ribes eradication work in this park in 1920 white pines were frequently found to be diseased; however, during 1934, due to periodical Ribes eradication, no new infections were observed.

Ribes eradication work during 1934 began in Interstate Park on August 27 and continued until September 13. Local labor was used on this

Table 61. - FERA Local Control, Wisconsin, 1934.

County	Acres White Pine Protected	Acres Worked: Crew	Acres Worked: Scout	Acres Worked: Total	Ribes Pulled: Crew	Ribes Pulled: Scout (Incl. cult.)	Ribes Pulled: Total	Cult. Black Cur.	Man-Days Labor: Crew	Man-Days Labor: Scout	Man-Days Labor: Total	Man-Days Supervision: Crew	Man-Days Supervision: Scout	[illegible]
						Initial Eradication								
Douglas	147	315	106	421	806,871	210	807,181	7	1,814	10	1,824	173	2	[illegible]
Lincoln	289	350	655	1,005	132,770	2,066	134,836	-	629	30	659	6	6	[illegible]
Marathon	1,980	2,272	2,695	5,967	371,291	2,850	374,144	5	2,035	130	2,165	50	35.5	[illegible]
Marinette	169	155	342	497	163,352	5	163,357	-	385	55	369	16	2	[illegible]
Monroe	2,015	2,540	8,609	11,149	383,724	5,562	389,286	-	1,075	59.75	1,161.75	160.5	60.75	[illegible]
Portage	1,881	1,955	5,930	7,785	442,146	15,975	457,122	-	1,301	77	1,378	68.5	22.5	[illegible]
Shawano	1,620	3,260	5,971	9,861	910,556	35,640	946,996	-	2,092	159.5	2,251.5	84.75	20.75	[illegible]
Washburn	385	2,590	1,097	3,687	155,929	1,958	160,888	27	2,226	19	2,245	65.5	9	[illegible]
Wood	2,428	3,916	6,564	10,354	195,176	5,054	201,230	-	905.5	50	972.5	80.5	5.5	[illegible]
Totals	10,132	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
						Second Eradication								
Douglas	49	95	-	95	359,821	-	359,821	-	1,067	-	1,069	112	-	[illegible]
Polk	808	1,647	1,905	2,554	292,630	2,312	294,942	-	884.5	18.5	903	47	14	[illegible]
Shawano	1,396	1,572	2,596	5,248	265,351	8,374	274,225	-	750.6	53.5	804	28.5	7.0	[illegible]
Totals	[illegible]	3,317	5,581	[illegible]	617,912	[illegible]	[illegible]	-	[illegible]	72	[illegible]	[illegible]	[illegible]	[illegible]
Grand Tot.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

	Man-days labor per acre worked	Ribes per acre worked
Initial Eradication	[illegible]	[illegible]
Second Eradication	[illegible]	[illegible]
Total	[illegible]	[illegible]

project paid by the Wisconsin Conservation Department, except for a small portion which was financed by the FERA and Polk County. Supervision was furnished by the Wisconsin Department of Agriculture and Markets.

The white pine in Potawatomi State Park is located along the west shore of Sturgeon Bay. The trees vary in size from reproduction to pines about 16 inches DBH. Control work began in Potawatomi State Park on July 24 and continued until August 17. Local labor was used which was paid by the Wisconsin Conservation Department. Supervision was furnished by the U. S. Bureau of Entomology and Plant Quarantine from funds allotted that Bureau by the Public Works Administration. Most of the laborers used in this work had been employed previously in other capacities by the Conservation Department and had received experience in crew formation in connection with reforestation; so these men required a minimum of training in Ribes eradication work. A summary of the local control work performed in Wisconsin state parks during 1934 is given in Table 63.

Emergency Conservation Work

Ribes eradication was performed under the ECW programs administered by the Wisconsin Conservation Department, the U. S. Indian Service and the U. S. Forest Service. No ECW camps were established specifically for blister rust control. This work was adopted, however, as a regular project in the camps located in any particular white pine growing region.

In general, local control was conducted as in the past by working Ribes concentrations with a five-man crew and a crew foreman back of the line. Areas which were Ribes free, or nearly so, were covered by one or two scouts who zigzagged through the territory. With but few exceptions excellent work was done by the CCC enrollees.

Instead of pieces of paper, string was used in some of the camps to mark crew strip limits. This method of marking proved entirely satisfactory.

While blister rust control work was governed by the same general set of plans in all camps, irrespective of the supervising agency, there was a marked difference in the type of organization for each group. Therefore each group of ECW camps will be discussed separately.

Wisconsin Conservation Department ECW

The Wisconsin Conservation Department ECW program permits a permanent blister rust control foreman to be assigned to each camp located in a white pine growing region. This blister rust control foreman is definitely assigned to white pine blister rust control work in the general vicinity of the camp. He continues in this work until the end of the field season when the camp superintendent assigns him to a regular foreman's job until the next field season.

During 1934 Ribes eradication work progressed in 15 Wisconsin Conservation Department ECW camps. The work was supervised by 13 foremen. The camps were divided into four groups, and a blister rust control checker was assigned to each group. The checker therefore was re[illegible]

Table [illegible] [illegible] Control, Wisconsin, 1934

Field Unit Project	Acres W. P.	Acres Worked Crew	Acres Worked Scout	Acres Worked Total	Ribes Pulled Crew	Ribes Pulled Scout	Ribes Pulled Total	Man-days Labor Crew	Man-days Labor Scout	Man-days Labor Total
[illegible]ntowoc	289	635	64	699	65,464	100	65,564	104	3	[illegible]
[illegible]	145	144	65	667	66,000	56	66,056	118	[illegible]	119
Total [illegible] and Scout.	277	1,107	99	1,196	130,964	166	131,120	220	3	223

Man-days Ribes per man-day	Acres per man-day	Labor State*	Labor FERA	Labor County	Labor Total	Supervision State**	Supervision ERA	Supervision Total	Labor [illegible]	Transportation State**	Transportation ERA	Transportation Total	[illegible]	Total Cost	Cost per acre	Cost per [illegible]
[illegible] Subsistence																
147	100	426.80	—	-	426.80	-	124.60	124.60	[illegible]	-	60.49	60.49	5.77	370.39	[illegible]	[illegible]
[illegible] Subsistence																
[illegible]	86	485.88	75.24	11.88	60.25	57.80	18.20	96.00	14.40	27.00	[illegible]	27.00	[illegible]	750.18	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,065.47	71.80	[illegible]	220.20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,140.17	[illegible]	[illegible]

* Wisconsin Conservation [illegible] funds. Rate of pay for labor - $4.00 per man-day.
** Wisconsin Department [illegible] and [illegible] funds.

for the general supervision of control work in his district which usually comprised three or four camps. In addition to their regular supervisory work two of the checkers directly supervised control work in one camp in each of their districts. While the blister rust foreman had direct charge of the Ribes eradication work at a camp under the immediate supervision of the camp superintendent, the checker in turn was responsible to the state blister rust supervisor for the systematic inspection of each area worked by foremen and CCC crews. If the checker found the control work satisfactory, he approved it and entered it as such in the records.

Usually 25 CCC boys were assigned by the camp superintendent to a blister rust control foreman for Ribes eradication work. A unit of CCC boys of this size filled a large ECW truck. The crews left camp at 7:30 o'clock in the morning and returned at 4:00 o'clock in the afternoon. Several camp superintendents assigned an additional truck-load of CCC boys to assist the regular Ribes eradication crew for a month or longer at a time.

Superintendents as a rule realized that Ribes eradication was limited to a short season of four and one-half months. It was obvious that blister rust control crews had to be large during this field season, that they had to make tremendous progress during this short period.

Each blister rust control crew was permitted to work within a twenty-five mile radius of its camp. Usually when a crew worked five miles or more from camp two assistants to the camp cook brought a warm dinner to the boys by truck. This dinner arrangement kept the actual field working hours of the CCC boys at a maximum.

Side camps were established when white pine tracts located a considerable distance from the main camp were to be protected. These side camps usually were established within the heart of a pine region needing blister rust protection. Ordinarily this side camp was within thirty miles of the main camp.

Blister rust control checkers and foremen assisted with fire suppression work whenever called upon. Occasionally a blister rust crew would discover a fire burning some distance away, proceed to it and suppress it before the main fire-fighting force arrived. Out of an approximate total of [illegible] man days during which checkers and foremen were available for blister rust control work, 162 man days were spent on fire suppression. The spring season of 1934 was so extremely dry that numerous forest fires occurred, and because all CCC crews and foremen were engaged in suppressing these fires, blister rust control work began in some camps about three weeks later than usual.

During 1934, 18,101 acres of white pine were protected from blister rust by the removal of 4,448,165 Ribes from 54,910 acres of land, as shown in Table 64. In addition to the above acreage 682 acres of potential white pine planting areas were also protected.

The above figures indicated the favorable response to the white pine blister rust control project throughout the ECW camps regardless of the [illegible]

that some camp superintendents had, previous to the establishment of the camps, known little of blister rust control work. The importance of white pine to the State has been generally recognized, but not always have people realized the seriousness of blister rust or the ease by which control measures could be applied. The progress of this control work throughout the entire group of Wisconsin Conservation Department ECW camps during 1934 has been satisfactory and entered into whole-heartedly by the participants.

The summary of control work performed by Conservation Department ECW camps is listed in Table 64.

U. S. Indian Service ECW

During 1934 control work using ECW Indian labor was conducted on three reservations in Wisconsin, namely, the Lac Courte Oreilles in Sawyer County, the Lac du Flambeau in Vilas County and the Menominee in Shawano and Oconto Counties.

No camps were established on either the Lac Courte Oreilles or Menominee reservations; instead the Indians were hauled to and from work by trucks. An ECW camp, however, was established near the village of Lac du Flambeau, Wisconsin, on the Lac du Flambeau Reservation for those Indians living in rural districts. Indians who live at home, that is in the Lac du Flambeau village were reimbursed for their subsistence.

Large Ribes eradication programs were in progress on both the Lac Courte Oreilles and the Lac du Flambeau Reservations during the summer, and as they are separated by only about 100 miles the keen rivalry which existed between the two groups centered on a controversy as to which reservation possessed the championship Ribes eradication crew. This feeling of rivalry was used advantageously in promoting the first Ribes eradication contest ever held in Wisconsin between Indian reservations. It took place on July 28, 1934, during a Field Day celebration at Lac du Flambeau when a picked Indian crew from the Lac Courte Oreilles Reservation, which had challenged the best crew on the Lac du Flambeau Reservation, fought out in the midst of great excitement among the spectators a close and fierce battle. The contest was won by the Lac du Flambeau crew by a narrow margin. The [illegible] supervisor was asked to judge this event, so a system for judging was originated whereby points representing actual work accomplished were used instead of leaving the decision to the personal opinion of the judge. The score card was based on the following:

	Position	Points
I. Accuracy: Lowest Ribes live stem per acre	1st	500
(Team must be below 25 f.l.s. per acre to qualify)	2nd	400
II. Speed: Elapsed time to work strip	1st	400
	2nd	350
III. Crew Formation: Other Items:		
Efficiency of crew foremen and sub-crew foremen	1st	100
	2nd	50
Bushes hung securely and completely off ground	1st	100
	2nd	50

Table [illegible] Ribes? Control, Wisconsin, 1936.

Camp Number and Name	Acres Protected: Plant Sites	Acres Protected: White Pine	Acres Worked: Crew	Acres Worked: Scout	Acres Worked: Total	Ribes Pulled: Crew	Ribes Pulled: Scout	Ribes Pulled: Total
Initial Eradication								
153 [illegible]	-	136	927	448	1,375	101,062	11,271	[illegible]
505 [illegible] Lake	-	1,477	1,124	6,681	7,805	581,183	5,940a	546,0[illegible]
548 Smith Lake	440	4,114	5,646	1,437	6,083	652,069	741	[illegible]
558 [illegible] Lake	35	948	2,974	-	2,974	756,096	-	[illegible]
579 [illegible]	10	551	285	776	1,065	486,154	101	[illegible]
713 [illegible] Lake	-	1,095	1,500	4,502	5,407	581,131	7,048	[illegible]
734 Blue Lake	-	5,585	999	8,715	9,714	166,056	1,910	[illegible]
775 Solon Springs	-	115	894	56	950	605,488	-	[illegible]
765 Mercer	-	1,580	962	3,096	4,128	185,145	2,565	[illegible]
548 [illegible]	-	690	684	427	1,097	286,705	180	[illegible]
708 Dunbar	-	900	524	1,095	1,602	175,390	400	[illegible]
723 Globe	-	340	1,086	600	1,308	305,659	445	[illegible]
759 Star Lake	-	1,744	845	4,455	5,277	77,166	1,575	101,7[illegible]
DSF-65 [illegible]	-	145	577	1,180	1,607	36,405	20,440	78,0[illegible]
DSF-95 [illegible] Point	160	860	595	-	655	-		-
Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Second Eradication								
588 [illegible] Lake	6	12	72	-	72	308	-	308
753 [illegible]	-	754	-	1,366	1,366	-	1,020	1,020
Totals	6	766	72	1,366	1,438	308	1,020	[illegible]
Total per acre and Ribes	646	18,101	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Camp	Man-days: Labor Total	Man-days Supervision: Crew	Man-days Supervision: Scout	Man-days Supervision: Total	Salaries and Subsistence: Labor WPCW	Salaries and Subsistence: Supervision WPCW	Salaries and Subsistence: Supervision Total	Transportation: Labor ECW	Transportation: Supervision ECW	Transportation: Supervision Total	Total Cost
Initial Eradication											
153	1,050	42.5	7.5	50	3,150.00	316.00	316.00	39.15	-	-	4,196.37
505	1,197.5	57.25	17	74.25	6,410.50	391.78	391.78	486.05	74.55	74.55	7,094.47
548	1,099	70	8	98	5,660.50	565.12	565.12	-	42.10	42.10	6,144.75
558	1,087	15	-	15	5,281.00	90.75	90.75	-	-	-	5,808.75
579	1,404	61.5	7	71.5	4,974.00	501.82	501.82	98.07	.82	.82	5,868.51
713	1,765	45	27	72	7,304.00	540.00	540.00	715.58	172.35	172.35	8,091.64
734	1,555	45.5	24.5	70	4,944.00	549.35	549.35	150.78	18.25	18.25	6,155.32
775	1,198	60	3	63	5,227.90	537.90	537.90	51.74	-	-	5,995.54
765	1,508.5	43.5	16.5	60	3,915.00	169.10	169.10	140.47	19.96	19.96	4,284.08
548	1,511	90	2	92	3,945.00	459.50	459.50	-	36.55	36.55	4,407.75
708	1,088	25.5	19.5	45	5,085.00	540.54	540.54	77.07	13.42	13.42	6,211.16
723	1,340	66	4.1	70.1	5,044.00	566.49	566.49	257.11	49.95	49.95	6,476.75
759	1,750	56.5	31.5	88	5,250.00	436.56	436.56	311.06	54.45	54.45	6,052.17
DSF-65	451	18.1	7.78	25.88	1,353.00	136.35c	136.35	70.71	40.62c	40.62	1,600.71
DSF-95	176.5	15	-	15	585.50	56.10	56.10	5.29	-	-	704.88
Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Second Eradication											
588	15	1	-	1	69.00	4.26	4.26	-	-	-	73.26
753	71	-	-	-	112.00	-	-	5.04	-	-	112.04
Totals	86	1	-	1	295.[illegible]	4.26	4.26	5.04	-	-	[illegible]
Total per acre and Ribes	1,0[illegible]	668.56	185.85	857.90	57,090.60	4,286.44	4,446.45	1,[illegible].81	516.42	505.[illegible]	63,5[illegible]

a. Includes 40 Ribes [illegible].
b. $3.00 per CCC man-day.
c. WPA Funds.

	Man-days labor per acre worked	Ribes per acre worked
Initial Eradication	.40	85
Second Eradication	.05	2
Total	.40	81

	Position	Score
Proper crew alignment	1st	[illegible]
	2nd	[illegible]
When Ribes discovered, crew man yell "bush"; checker [illegible] yell "check"	1st	[illegible]
	2nd	[illegible]
No [illegible] in line	1st	[illegible]

Definite strips were laid out using string lines as boundaries. These strips began in a swamp, however, a part of each strip was upland type. The contest started with each crew lined up behind a string line at the [illegible] of their respective strips. As soon as the signal to proceed was given each crew broke through the string, proceeding along their strips at a [illegible] pace and finished at a road where the spectators were assembled. Consistent with all Indian Reservations in Wisconsin, regular [illegible] crew formations were used.

When both crews completed their strips each one made a 100 percent systematic check of the strip worked by its opponent. Checkers were stationed along the string lines beside the end man of each crew to make sure that only the portion within the strip was included in the check. All the Ribes bushes found on the check strip were given to the judge who counted them and recorded the [illegible] of live stems.

The element of competition as expressed in this Ribes eradication contest was brought out to create interest in blister rust control among members of the tribe on both reservations as well as [illegible] the CCC crews [illegible] engaged in Ribes eradication.

During 1934, 5,806 acres of white pine were protected from blister rust on the Lac Courte Oreilles, Lac du Flambeau and Menominee Reservations by the removal of 3,354,[illegible] Ribes bushes. A summary of control work performed on each reservation follows:

Lac Courte Oreilles Indian Reservation

The Lac Courte Oreilles reservation contains approximately [illegible] acres of [illegible] white pine as disclosed by the pre-eradication survey made during the summer of 1934. Very little mature timber remains. Almost the entire pine acreage consists of white pine reproduction and of immature timber in the 25-40 year age class. There are, however, white pine seed trees scattered throughout the reservation which should produce natural reproduction if protected from blister rust and fire.

White pine blister rust was first discovered on this reservation in [illegible] when ten white pines were found infected near the Indian village of [illegible]. As a result of this discovery, [illegible] strip of land approximately [illegible] fifty yards wide was eradicated of Ribes. At that time also the visibly infected trees were destroyed in order to delay spread of the disease. It is interesting to note that this strip worked 14 years previously in [illegible] showed a decided decrease in the number of Ribes found during the 1934 eradication season compared with the remainder of the pine area which had never been worked before. During the current season Ribes [illegible]

some white pine seeds found [illegible] with blister rust in the vicinity of [illegible].

Control work during 1938 began on May 31 and terminated on September 15. A total of 1,0[illegible] acres of white pine were protected, and 4,[illegible] acres were worked to protect this pine. From this area 507,[illegible] Ribes were eradicated. The local unit of the CCC supplied the labor which varied from 35 to 1[illegible] Indians per day. Supervision was furnished by the U. S. Bureau of Entomology and Plant Quarantine with ECW funds.

Ribes were found distributed quite generally over the Lac Courte Oreilles Indian Reservation except near the Chippewa River flowage where absence of [illegible] swamps and streams precluded the occurrence of [illegible] Ribes species, and where early forest fires of past years had practically removed upland Ribes species from the forest floor.

Except for a few days at the beginning of this project, [illegible] was used [illegible] to mark strip boundaries throughout the entire field season. It was also used by the project manager to [illegible] of each area. [illegible] proved valuable under the [illegible] conditions on the reservation.

It has been evident previously on other reservations and is true on the Lac Courte Oreilles Reservation that Indian labor is by nature well adapted to Ribes eradication work. The Chippewa Indians [illegible] the Lac Courte Oreilles Reservation [illegible]. They are keen [illegible] and quick to [illegible] Ribes. Their [illegible] in [illegible] instructions and their steadfast loyalty to the blister rust project from beginning to end [illegible] apparent throughout the season.

Table [illegible] lists the summary of control work on the Lac Courte Oreilles Reservation for 1938.

Lac du Flambeau Indian Reservation

The Lac du Flambeau Reservation has approximately 1,4[illegible] acres of good white pine according to the detailed pre-eradication survey made during the summer of 1938. The last comprehensive survey of 1936 was found inadequate in [illegible]. The 1938 [illegible] supplementary work was done and the 1938 pine area maps superseded the [illegible] maps.

Some [illegible] percent of the pine of this reservation is [illegible] and the remainder is immature pine, principally reproduction. Much of the young pine is thrifty and is making good growth. Much of the immature pine apparently will remain there indefinitely for scenic purposes since it is located along lake shores and consequently possesses high aesthetic value. In most instances the pine reproduction on the reservation [illegible] since [illegible] in a temporary forest type, it will be replaced eventually by [illegible]. Much of the area is [illegible] soil which is practically devoid of Ribes except along streams, lake shores, and in [illegible] swamps.

The control project began on the reservation on May 26 and continued until October 4, employing approximately 60 Indians during this period. A fire in [illegible] interrupted the work from August 15 to August 17.

locality. A total of 2,600 acres of white pine were protected and [illegible] acres were worked to protect this pine. Of the [illegible] acres worked [illegible] acres were heavy with Ribes and were thus worked by crews. The remaining [illegible] acres were scouted.

Not all of the pine on the Lac du Flambeau Reservation belongs to Indians since one entire pine tract and parts of several other tracts that were worked belong to white citizens of Wisconsin. For this reason supervision for this project was furnished by the Wisconsin Department of Agriculture and Markets.

The second eradication job on the Lac du Flambeau Reservation has been completed. The reason for a second eradication following the first eradication so closely in this case was because of the extreme density of Ribes in alder swamps and other areas which contained Ribes. For this reason it may be advisable to check within about five years those areas which were worked by crews and which were initially heavy with Ribes to ascertain Ribes conditions and determine whether reworking will be necessary. Ordinarily about three workings will protect white pines to maturity. This periodic check and possibly another reworking is especially urged because of the high aesthetic value which most of the white pine on the reservation possesses.

Table 65 lists the summary of control work on the Lac du Flambeau Reservation for 1934.

Menominee Indian Reservation

The Menominee Indian Reservation comprises ten townships, seven townships in northwestern Shawano County and three townships in southeastern Oconto County. The entire area is one contiguous tract of land of Indian ownership.

The Menominee Reservation is practically all wooded. Both coniferous and hardwood forests are present. The hardwood types predominate in beech, birch, and maple and the coniferous types consist chiefly of hemlock and white pine. Large areas of white pine are found in pure stands. However, some areas have hardwoods or hemlock intermixed with the pine. The timber on a small portion of the white pine acreage is mature but by far the largest percentage is immature. These pine stands are most abundant in the southeastern part of the reservation. This large area of white pine on the Menominee Reservation perhaps forms the largest contiguous tract of pine found in the Lake States today. Estimates on a few selected areas indicate that some of these areas contain approximately 100,000 board feet per acre. Some of the trees on these individual tracts measure as much as six feet in diameter, and it is estimated that they are merchantable for eight sixteen-foot log lengths. In 1930 the Forester of the reservation estimated that 50,000,000 board feet of white pine timber remains.

Probably the only Indian-owned and Indian-operated sawmill in the United States is located at Neopit, Wisconsin, on the Menominee Indian Reservation. A logging railroad hauls the logs to the mill where they are sawed into desired dimensions; consequently the lumber industry absorbs the services of many Indians.

Table [illegible] Wisconsin, 19[illegible]

[illegible]	Lineal [illegible]	Acres Treated			Piles [illegible]			[illegible]	
[illegible] Operation	[illegible]	[illegible]	[illegible]	Total	[illegible]	[illegible]	Total	[illegible]	[illegible]
[illegible]									
[illegible]	4,060	8,575	1,616	6,095	791,515	17,557	797,064	2,059	[illegible]
[illegible]	68	140	288	428	140,850	–	140,850	948	[illegible]
[illegible]	5,508	1,940	1,791	4,437	1,772,207	21,275	1,802,264	7,461.77	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]									
[illegible]	1,540	[illegible]	1,224	[illegible]	141,764	300	110,038	201	[illegible]
[illegible]	950	49	471	386	37,067	8,616	46,503	128	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]	Per Acre [illegible]		[illegible]										
[illegible]	[illegible]	[illegible]	Labor*	[illegible]	[illegible]	Total	[illegible]	[illegible]	[illegible]	Total	[illegible]	Total
[illegible]												
[illegible]	197	1.06	197	11,421.40	–	447.50	[illegible]	[illegible]	–	[illegible]	[illegible]	[illegible]
[illegible]	62	2.24	782	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]
[illegible]												
[illegible]	67	.15	77	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	11	[illegible]	[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* Rate of Pay:
[illegible], $1.10 – $5.00 per 100 man-days.
[illegible], $1.20 – $1.00 " " " "
[illegible], $1.00 – $2.00 " " " "

† State Funds.

It has been estimated by the U. S. Indian Service, largely as a result of the blister rust control pre-eradication survey, that there are 36,374 acres of white pine on the reservation. This acreage would be subdivided approximately as follows:

Mature white pine -	11,424 acres
Young white pine, well stocked - - - - - - - - - - - - - -	9,840 acres
Young white pine, poorly to medium stocked - - - - - - -	15,110 acres
Total -	36,374 acres

Omitted from the above figures are 1,378 acres of heretofore excellent young pine reproduction which was destroyed by fire during May 1934. This tract had been protected from blister rust during 1933.

White pine blister rust was found and identified as such for the first time on the Menominee Reservation on August 12, 1918, when some infected *Ribes cynosbati* bushes were discovered on Saint Joseph's Hill at Keshena, Wisconsin. The following year, 1919, eight infected white pines were found on this same hill. During 1920 Ribes and pine infections were discovered at five different locations within a mile radius of Keshena.

During 1933 and 1934 white pine blister rust was found distributed lightly on Ribes over the northern portion of the reservation and most severe on pines and Ribes in the southern and especially the southeastern part. Over small areas in the vicinity of Keshena severe damage to young pines was observed.

An enlarged control program begun on the reservation in 1933 was continued throughout the summer of 1934. The number of Indians given employment in this 1934 ECW project varied from 52 in June to 77 in early August. During the latter part of August some 100 Indians were employed.

Two of the five technical foremen were assigned exclusively to white pine mapping and pre-eradication survey work. These foremen usually worked individually but each was assisted by one or two Indian enrollees who worked some few chains from the foreman. The foreman ran the compass line, paced the distance traveled and prepared the pre-eradication survey map. The Indian assistant when necessary would meander from the survey line when the foreman needed information on the limits of white pine and on extent of Ribes types. These pre-eradication survey crews traveled through every "forty" parcel.

Pre-eradication survey work was done in immature white pine stands since control work in mature pine forests will be deferred until after the tract has been logged. Oftentimes, logging disturbs the soil sufficiently to enable Ribes plants to become more abundant after logging than before logging. Furthermore, a stand of mature pine killed by blister rust consists of trees large enough to be utilized.

The 1934 Ribes eradication program began June 11 and terminated September 27. The work was restricted to areas mapped during pre-eradication surveys either in 1933 or the early part of the 1934 season. Five crews were used. Each crew consisted of seven to nine Indians and was directly super-

vised by an Indian crew foreman who checked behind the line to assist the crew foreman. During the 1934 Ribes eradication season 7,850 acres of white pine were protected, 4,265 acres were worked and [illegible] Ribes were destroyed.

The areas designated on the pre-eradication map as scout areas were eradicated of Ribes by a scouting organization made up usually of three Indians. These scouts worked abreast, from 10 to 20 feet apart, depending upon Ribes abundance and brush density. If a small moist area was found which supported a heavy Ribes population, the scouts worked in close formation until the area was cleared of Ribes.

Table [illegible] lists the summary of Ribes control work performed on the reservation during 1934. Nearly all of the control work has been done in the southeastern part of the reservation, in the vicinity of Keshena, Wisconsin. Up to this date approximately 6,974 acres of immature white pine have received initial protection by the removal of over 3,500,000 Ribes from some 12,601 acres worked.

White pine blister rust has progressed to a point where visible damage has occurred in several of the unprotected pine stands on the Menominee Indian Reservation. These infected pines are convincing evidence that young pine stands growing intermixed with Ribes cannot reach maturity. If this important timber resource of the Menominee Tribe is to be conserved, it is imperative that the control of white pine blister rust be incorporated in the timber management plan, which is prepared to produce timber on the reservation on a permanent basis.

U. S. Forest Service ECW

There are two national forests established within the State, the Chequamegon in Northwestern Wisconsin, with headquarters in the city of Park Falls, and the Nicolet in Northeastern Wisconsin, with headquarters at Rhinelander. These forests are being expanded as the Forest Service makes additional land purchases. The Chequamegon National Forest now contains five Ranger Districts, the Flambeau, Mineral Lake, Mondeaux, Moose River and Moquah. The Nicolet National Forest consists of three Ranger Districts, the Argonne, [illegible] and [illegible].

Although white pine was the predominating tree species on a large portion of the area in the original forest, a destructive logging practice by lumber companies and repeated forest fires which followed left the land not only practically devoid of white pine reproduction but also left some of it without white pine seed. As a result of this carelessness much of the area which formerly grew pine needs replanting.

The Chequamegon National Forest possesses approximately [illegible] acres of native white pine located chiefly in southern Bayfield and Northern Sawyer Counties. In addition, this forest contains many thousand acres of excellent planting sites for white pine. The Nicolet National Forest contains approximately [illegible] acres of immature white pine located chiefly in Vilas and Forest Counties and some 125,000 acres of good planting sites.

An ECW Technician was in immediate charge of blister rust control on U. S. Forest Service land. He of course worked in close contact with the two Forest Supervisors in charge. The Forest Supervisors of these forests have had a very favorable attitude toward the blister rust control program and have cooperated to the fullest extent.

Not all of the land within the gross boundary of the national forest is owned by the U. S. Forest Service. There is private, county and State land within its borders also, and generally these ownerships are intermingled with Federal ownership and in some cases exceed the amount of land owned by the Federal Government.

Since the beginning of the ECW movement the general practice of the Forest Service has been to protect merely that pine which belongs to the Federal Government rather than to protect all the pine within the general vicinity of a CCC camp regardless of ownership, as has been done by other ECW forces in Wisconsin. Presumably this Forest Service practice will be changed during 1935 thereby permitting CCC camps within the borders of the Forest Service lands to assist with control work on private, county and State lands.

During 1934 the United States Forest Service protected 2,077 acres of white pine and 2,235 acres of potential white pine planting sites. A total of 1,202,106 Ribes were removed from the 18,314 acres worked. Table 46 lists the summary of Ribes eradication work on the Chequamegon and Nicolet National Forests during 1934.

<u>Chequamegon National Forest</u>

During the Ribes eradication season an ECW checker assisted with control work on the Chequamegon National Forest. Since the prerequisite of a Ribes eradication program is the mapping of white pine stands, much of his time was devoted to this work. A large area in the southern portion of the Moquah Ranger District and practically all of the pine areas in the other districts were completely mapped.

Because of a lack of technically trained foremen for all camps in the Chequamegon National Forest, it was necessary to resort to CCC supervision. Technical foremen, however, were available in two of the camps within the forest. It is obvious that much better progress would have been made if technical foremen had been available throughout. In several instances, when CCC's were directly responsible for supervision of eradication crews, it was necessary to have these crews rework the area before it would measure up to the 25 FLS standard as established by the Wisconsin Department of Agriculture and Markets and the U. S. Bureau of Entomology and Plant Quarantine. In the Moquah area of the Moquah District some 11,[illegible] acres of white pine needing protection will receive the chief concentration of eradication work within this national forest, according to the 1935 blister rust control plan.

<u>Nicolet National Forest</u>

An ECW blister rust checker was assigned for the summer to assist with blister rust control work in the Nicolet National Forest. Experienced foremen taken from the ECW rolls were obtained at all camps in this forest

Table No. - U.S. Forest [illegible] Control, Wisconsin 1936. (Initial Eradication)

National Forest	Acres Protected: Plant'g Sites	Acres Protected: White Pine	Acres Worked: Crew	Acres Worked: Scout	Acres Worked: Total	Ribes Pulled: Crew	Ribes Pulled: Scout	Ribes Pulled: Total	Man-Days Labor: Scout	Man-Days Labor: Total	Man-Days Supervision: Crew	Man-Days Supervision: Scout	Man-Days Supervision: Total	Costs: Labor*	Costs: Supervision	Costs: Transportation	Total Cost	[illegible]
Chequamegon	785	888	1,00?	7,2?5	[illegible]	[illegible]	1,4??	[illegible]	[illegible]	[illegible]	1??	4.7	1??.?	$ [illegible]	$ [illegible]	$ [illegible]	$ [illegible]	[illegible]
Niccolet	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total ECW	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Nicolet	—	845	860	2.0??	1,??7	[illegible]	1,7??	[illegible]	[illegible]	??5	35	[illegible]	[illegible]	$ [illegible]	$ [illegible]	$ —	$ [illegible]	[illegible]
Total ECW and TSA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$ [illegible]	$ [illegible]	$ [illegible]	$ [illegible]	[illegible]

* Rate of Pay
$5.00 per [illegible]

	[illegible] per acre worked	Ribes per acre worked
ECW Program	[illegible]	[illegible]
[illegible] Program	[illegible]	[illegible]
Total	[illegible]	[illegible]

which conducted Ribes eradication work. Consequently, [illegible] held at a minimum. The bulk of the Ribes eradication work on the Nicolet National Forest during 1934 was accomplished in the Argonne District at the Pine Mile and [illegible] Camps. [illegible] crews of [illegible] men each operating in crew strips were employed throughout the season. String was used to mark the edge of each strip worked where the undergrowth was dense and where windfall was encountered. In the more open forest types pieces of paper were used to mark the limits of each strip worked. This method of using string where sight conditions were limited and pieces of paper where the territory was more open proved entirely satisfactory.

The heaviest pine and Ribes infection observed on the Nicolet National Forest was discovered in the northern part of the Argonne District.

The [illegible] of the Argonne District [illegible] only a limited area suitable for the planting of white pine because of the immense amount of swamp land containing heavy concentrations of Ribes. It would be advisable, no doubt, to plant white pine in large blocks, thereby reducing the size of the necessary protective zones. The Oconto District has very little advanced white pine growth; however, it does contain some 50,000 acres of potential white pine planting areas.

The Peshtigo District is a new one and as yet no intensive white pine survey has been made of it. The best estimate available at this time lists approximately 2,400 acres of medium and well-stocked white pine.

Table 69 shows the total of local control accomplished in Wisconsin during 1934 according to Programs. Table 70 shows the work done according to counties, agencies and ownership classes. Tables 71 and 72 show similarly the work done from 1930 to 1934 inclusive.

Table 73 briefly summarizes control work done by years, since it was started in 1930 to 1934 inclusive.

The status of local control work in Wisconsin at the end of 1934 is as follows:

Acres of white pine to be protected	[illegible]
Acres white pine initially protected to date	[illegible]
Percent white pine acreage initially protected	[illegible]
Acres of white pine given second Ribes eradication work	[illegible]
Percent white pine acreage given second Ribes eradication work	[illegible]

Analytical Ribes Eradication by Ribes Types

Previous to any Ribes eradication work, the area to be worked is divided into Ribes types. In this region, there are six Ribes types, in each of which the Ribes situation is fairly constant and varies within relatively narrow limits. These Ribes types in brief are:

Table [illegible] [illegible] Local Control, Wisconsin, 1936.

Agency	Acres Protected: Flight Sites	Acres Protected: White Pine	Acres Mapped: Crew	Acres Mapped: Scout	Acres Mapped: Total	Miles: Crew	Miles: Scout (incl. [illegible])	Miles: Total
[illegible]								
[illegible]	-	3,612	4,561	4,097	5,958	3,717,264	71,560	[illegible]
[illegible] ECW	185	17,858	57,597	52,776	85,475	4,507,349	58,672	[illegible]
[illegible] Parks	-	189	757	64	822	86,464	100	[illegible]
[illegible]	8,029	1,994	1,795	6,964	13,357	774,492	4,184	[illegible]
[illegible]	-	353	538	1,099	1,677	221,795	1,787	[illegible]
[illegible]	-	13,192	17,285	32,180	50,457	8,071,296	70,737	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	11,[illegible]	[illegible]	[illegible]
[illegible]								
[illegible]	-	5,190	487	8,040	4,136	158,351	2,918	[illegible]
[illegible] ECW	[illegible]	756	72	1,956	1,486	208	2,330	[illegible]
[illegible] Parks	-	186	644	23	667	39,500	68	[illegible]
[illegible]	-	3,869	3,307	3,501	6,598	807,714	13,[illegible]	[illegible]
Total	0	7,[illegible]	4,500	13,[illegible]	11,[illegible]	1,[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	14,[illegible]	[illegible]	[illegible]	[illegible]	13,[illegible]	[illegible]	[illegible]

Man-days Labor: Crew	Man-days Labor: Scout	Man-days Labor: Total	Man-days Supervision: Crew	Man-days Supervision: Scout	Man-days Supervision: Total	Salaries and Subsistence: Labor	Salaries and Subsistence: Supervision	Transportation: Labor	Transportation: Supervision	Materials	Total Cost
[illegible] Eradication											
[illegible]	480	10,067	304	19	323	11,616.87	1,704.17	1,658.91	375.64	58.17	15,[illegible]
[illegible]	1,704	11,592	528	152	680	64,[illegible]	6,441.[illegible]	1,949.37	653.[illegible]	-	71,[illegible]
[illegible]	5	209	20	8	28	421.50	124.00	-	10.48	9.75	570.[illegible]
[illegible]	100	8,508	292	26	318	10,166.93	1,411.16	120.13	-	-	12,[illegible]
[illegible]	3	379	32	8	45	605.00	143.00	-	-	-	[illegible]
[illegible]	585	11,036	188	152	805	48,095.[illegible]	4,[illegible]	2,199.86	1,036.[illegible]	147.20	50,[illegible]
[illegible]	[illegible],077	18,[illegible]	[illegible]	407	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] Eradication											
[illegible]	46	1,000	42	23	64	1,765.46	420.50	147.77	98.12	3.57	2,[illegible]
[illegible]	70	95	3	-	3	209.10	4.36	3.04	-	-	[illegible]
[illegible]	-	214	14	1	17	521.80	84.00	15.51	59.26	7.27	755.14
[illegible]	75	2,784	184	15	198	9,704.[illegible]	1,121.10	495.25	179.09	27.94	11,[illegible]
[illegible]	196	3,131	[illegible]	[illegible]	[illegible]	$12,[illegible]	$1,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	3,[illegible]	50,[illegible]	1,[illegible]	441	[illegible]	$164,[illegible]	$14,[illegible]	$4,[illegible]	[illegible]	[illegible]	[illegible]

Table 14. - Acres of [illegible] - [illegible]

Classified according to County, Location and Ownership.

[illegible]

Table 69. - Acres of White Pine and Planting Sites Protected - Wisconsin - [illegible]
Classified according to Counties and Ownership
(Initial Eradication)

County	Acres Planting Sites	Acres White Pine	Private	County	State	Forest Service	Indian Service	Total
Adams		897	897					897
Ashland	360	460			180	628		1,208
Barron		695	695					695
Bayfield	515	580	582			810		1,098
Burnett		280	280					280
Chippewa		152	152					152
Clark		1,146	598	548				1,146
Door		2,360	661		1,759			[illegible]
Douglas		1,180	698		482			1,180
Dunn		1,418	1,137					1,418
Eau Claire		275	275					[illegible]
Forest	588	580	188	80	35	790		[illegible]
Iron		98					[illegible]	[illegible]
Jackson		4,112	3,741	550				4,112
Juneau		746	698	12	36			746
Langlade		385	385	192	[illegible]			[illegible]
[illegible]		[illegible]	155	[illegible]				[illegible]
[illegible]		1,378	[illegible]	101				1,2[illegible]
[illegible]		[illegible]	[illegible]	40	[illegible]			[illegible]
[illegible]		[illegible]	[illegible]					[illegible]
[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
[illegible]		[illegible]	[illegible]		[illegible]			[illegible]
[illegible]		[illegible]	[illegible]					[illegible]
[illegible]		[illegible]	[illegible]					[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 70. - Acres of White Pine and Planting Sites Protected - Wisconsin - [illegible]
Classified according to Counties and Ownership
(Second Eradication)

County	Acres Planting Sites	Acres White Pine	Private	County	State	Forest Service	Indian Service	Total
[illegible]*		487	460					[illegible]
Douglas		47	49					[illegible]
[illegible]		[illegible]	701					[illegible]
[illegible]		90					[illegible]	[illegible]
Oconto		1,350					1,150	1,350
[illegible]		1,400	[illegible]		[illegible]			[illegible]
[illegible]	[illegible]	30	30					[illegible]
Shawano		1,[illegible]	1,[illegible]	[illegible]				1,[illegible]
Vilas		[illegible]	[illegible]		[illegible]		[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]

* Includes [illegible] acres [illegible] Eradication.

Table 91. - Summary by Years of Ribes Eradication Work, Wisconsin 1918 to 1934, Inclusive.

Year	Acres Worked Initial	Acres Worked Second	Total	Ribes Pulled	Cost	Per Acre Cost	Per Acre Ribes	Cost per Bush. Quarts
1918	220	0	220	24,000	903.00	4.17	109.1	3.06
1919	75	0	75	5,944	126.59	1.62	79.9	2.37
1920	10,998	0	10,998	775,676	5,706.24	.55	70.5	.74
1921	8,897	0	8,889	457,093	3,620.94	.41	51.4	.79
1922	4,779	0	4,779	530,988	3,007.94	.63	111.8	.53
1923	5,729	15	5,744	294,043	7,871.96	.50	51.0	1.51
1924								
1925								
1926	95	150	229	53,878	770.90	3.29	249.8	1.35
1927	220	50	250	42,725	1,112.54	4.45	166.9	2.56
1928	547	0	347	75,851	1,045.95	3.01	220.1	1.21
1929	140	60	190	15,944	771.05	4.73	104.1	4.11
1930	441	0	491	164,485	969.10	1.97	335.0	.09
1931	3,367	880	3,957	315,859	1,999.03	.72	99.1	.34
1932	18,459	0	18,459	1,300,529	6,070.12	.32	70.2	.47
1933	50,580	0	105,891	8,552,340	43,690.46	.98	83.5	1.35
1934	125,700	17,738	240,705	15,129,500	175,380.01	1.74	92.0	1.20
Total	[illegible]	17,790	[illegible]	[illegible]	[illegible]	.15	[illegible]	1.02

A <u>Wet Swamp</u> - Alder swamp, cedar swamp, spruce-tamarack swamp, etc. Ribes abundant.

B <u>Muskeg Swamp</u> - Muskeg, peat, sedges, etc. Ribes usually absent except at edges.

C <u>Hardwoods</u> - beech, maple, hemlock, upland, rich loamy soil. Ribes usually numerous.

D <u>Pine</u> - Jack pine, Norway pine, white pine, often aspen. Sandy soils. Ribes usually few to absent.

E <u>Pasture</u> - Cut over, grazed lands. Ribes vary in abundance, usually large bushes.

F <u>Cultivated</u> - Cultivated fields or meadows. Ribes absent except along fence rows.

During the winter of 1935 the eradication job reports in the Lake States were broken down to show acres worked, Ribes pulled and man days employed by Ribes types and agencies doing the work. These data were then grouped to show Ribes per acre and man days per acre by Ribes types and Ribes-per-acre classes. This analysis in Wisconsin covered about two-thirds of the work done. Owing to the pressure of other work, this analysis was not completed. However, partial results of these studies are shown in Tables 72, 73, 74 and 75.

Note in Tables 72 and 73 that regardless of Ribes type the general trend is for the number of Ribes pulled per man day to increase with the number of Ribes per acre.

The largest average number of Ribes pulled per man day, 2,061, was recorded in Type "C", 801-1000 Ribes per acre class worked under the FERA program. No evidence is at hand as to the average size of these bushes.

Note in Table 74 that 27.8% of the acres worked showed no Ribes, and that 75.4% of the acres had Ribes at the rate of 1 to 200 per acre averaging, however, only 32 bushes per acre, or 91.1% of the area had less than 32 bushes per acre.

Note that areas supporting large numbers of bushes per acre were found in "A" and "C" types, with the exception of 3.2% in "D" type in the 1401 to 1600 Ribes per acre class.

In Table 75 there is shown a comparison of work done by the State ECW program and the FERA program. Note that with the possible exception of "A" type, apparently more work was accomplished per man day under the FERA than the State ECW programs. The former averaged 7½ to 8 hours over all time per day including travel and lunch time, while the ECW got in 6 hours on the job. It is believed that the amount of time actually [illegible] per man day was about equal under the two programs.

One value in any analysis of this sort is that acres worked per man day in different types and with various Ribes concentrations may be used as a guide in figuring pre-eradication costs.

Table [illegible] - [illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 74. - Percentage of Total Acres Worked in Each Hines-Per-Acre Class by Hines Types, State ECW and WPA Combined, Wisconsin, 1934.

Hines Per Acre Class	A	B	C	D	E	F	Total
	Hines Type						
0	14.2%	16.7%	11.9%	45.1%	13.2%	66.1%	42.0%
1-200	46.5	77.7	72.5	54.1	70.8	33.9	56.7
201-400	5.8	5.6	10.2	0.1	15.7	0	4.5
401-600	7.0	0	3.3	0	0.1	0	1.5
601-800	6.2	0	0.1	0	0.2	0	0.6
801-1000	3.9	0	0.4	0.2		0	0.6
1001-1200	5.8	0	0.7	0		0	0.7
1201-1400	4.8	0	0	0		0	0.4
1401-1600	1.5	0	0.6	0.5		0	0.5
1601-1800	0.6	0	0	0		0	0.1
1801-2000	0.5	0	0	0		0	Trace
2001-2200	0.2	0	0	0		0	Trace
2201 plus	2.7	0	0.3	0		0	0.3
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total acres	7,803	5,036	33,768	15,316	4,650	40,110	106,673

Table 75. - Analysis of Ribes Eradication by Ribes Types, Wisconsin, 1935

Ribes Type	Acres Worked	Number Ribes Pulled	Number Total Man-Days	Percent of Total Acres Worked	Percent of Total Ribes Pulled	Percent of Total Total Man-Days	Ave. Per Acre Ribes	Ave. Per Acre Man-Days	Ave. No. Ribes Pulled per Man-Day
				State ECW					
A - Live Swamp	3,931	[illegible]	[illegible]	7.9%	57.1%	39.9%	585	2.03	288
B - Muskeg	2,501	43,375	701.60	5.0	1.1	3.5	17	0.28	62
C - Hardwoods	21,258	1,630,979	10,036.00	42.9	41.0	50.2	76	0.47	165
D - Pine	16,950	20,653	1,040.00	34.2	0.5	5.2	1	0.06	20
F - Cultivated	4,975	14,391	216.58	10.0	0.3	1.1	3	0.04	66
Totals	49,613	4,008,220	19,974.33	100.0	100.0	100.0	81	0.40	202
				FERA					
A - Live Swamp	3,872	1,454,951	5,840.60	7.7%	38.7%	36.7%	376	1.51	249
B - Muskeg	537	13,560	113.45	1.1	0.6	0.7	25	0.22	157
C - Hardwoods	12,524	1,881,178	7,291.05	24.8	49.5	45.4	149	0.59	252
D - Pine	8,365	283,631	1,480.10	16.5	7.9	9.3	35	0.18	195
E - Pasture	4,029	111,912	716.70	8.0	2.9	4.5	28	0.18	155
F - Cultivated	21,137	25,132	377.90	41.5	0.7	2.4	1	0.02	67
Totals	50,459	3,759,364	15,824.90	100.0	100.0	100.0	75	0.32	237
				Both Programs					
A - Live Swamp	7,803	3,753,373	13,814.88	7.8%	45.3%	[illegible]	481	1.77	272
B - Muskeg	3,038	[illegible]	[illegible]	3.0	0.8	2.3	20	0.27	75
C - Hardwoods	33,782	3,512,157	17,327.05	33.8	45.1	48.5	104	0.51	203
D - Pine	25,315	304,284	2,520.10	25.3	4.0	7.0	12	0.10	123
E - Pasture	4,029	111,912	716.70	4.0	1.4	2.0	28	0.18	155
F - Cultivated	26,110	39,523	594.48	26.1	0.5	1.7	2	0.02	66
Total Both Programs	100,072	7,767,584	35,799.23	100.0	100.0	100.0	78	0.36	217

Checking

When Ribes eradication in and surrounding a pine stand is completed under the supervision of a blister rust foreman the area is systematically checked by a checker or an agent who determines whether or not the work is satisfactory; that is, whether the number of Ribes is sufficiently reduced to establish control of the rust and thus prevent serious damage to the pine stand. Very nearly all of the Ribes eradication work done in 1934 was satisfactory.

Nursery Sanitation

White pine is one of the principal tree species used for reforestation purposes in Wisconsin. For this reason the distribution of disease free white pine planting stock from producer to consumer is one of the essentials in controlling the spread of blister rust. It is possible for white pines within a nursery to become infected with the disease unless the environs of the nursery are free of all Ribes plants. Assurance of the production of white pine planting stock free from blister rust requires the establishment of Ribes free sanitation zones around those nurseries producing white pines. These sanitation zones consist of a 1500-foot Ribes-free area, instead of the 900-foot area used to protect white pine stands and the removal of the European black currant, *Ribes nigrum* L., for a distance of one mile from the nursery.

Nursery sanitation during 1934 was accomplished around seven nurseries: two private, two state and three Federal. Table 76 summarizes this work, while Table 77 summarizes all the nursery sanitation work done during the years 1923 to 1934 inclusive. The location of each nursery and the approximate number of white pines grown in each is as follows:

Nursery	Location	Approximate number of white pines
Goodman Lumber Co.	Goodman, Wis.	100,000
Nekoosa-Edwards Paper Co.	Port Edwards, Wis.	2,000,000
State (Conservation Dept.)	Trout Lake, Wis.	4,700,000
State (Conservation Dept.)	Wisconsin Rapids, Wis.	600,000
U. S. Forest Service	Rhinelander, Wis.	5,000,000
U. S. Forest Service	Butternut, Wis.	90,000
U. S. Indian Service	Keshena, Wis.	50,000

During 1934 the Nekoosa-Edwards Paper Company applied for a Federal pine shipping permit for its nursery and the U. S. Forest Service applied for a similar permit for its nursery located at Rhinelander, Wisconsin. Crew work around these two nurseries was not completed until late in the season, therefore, it was impossible for the U. S. Bureau of Entomology and Plant Quarantine to grant them a 1934 pine shipping permit. Inspections of the zones of each nursery, however, disclosed sanitary conditions. Should state and Federal inspectors find these zones in a sanitary condition during the spring of 1935 after they have been reworked by crews, a Federal pine shipping permit for 1935 for pines grown subsequent to the inspection may be granted.

Cultivated Black Currant Survey

The first systematic cultivated black currant survey work ever performed in Wisconsin was started in Shawano County on October 15, 1934. Similar surveys were started somewhat later in Douglas, Marathon and Wood Counties. The Shawano County project was supervised by a state foreman experienced in control activities. FERA and Dought Relief men assisted. These relief men were given training in the work and later each was assigned to a township by himself, usually to the township in which he lived. He was then given strict orders to cover every road in the township, to examine the garden of every property owner in urban and rural communities, whether the premises were occupied or not, and to keep adequate records of his findings.

The method used to organize and conduct this survey in Shawano County will be explained below, and in general this explanation will apply to the surveys in the other counties as well. Since no arrangement could be made by the local relief office to reimburse FERA workers for use of their personal cars, it was necessary to use Drought Relief workers in most instances. These Drought Relief workers received no cash payment; instead their earnings were credited as payment on feed and seed loans which they borrowed from the Federal Government the previous summer. They were paid at the rate of 81 cents an hour and transported themselves. Regular FERA men, however, were used to canvass the larger villages and cities in the county. In order that the most competent inspectors possible could be obtained, the foreman selected his men from a list compiled by the county agricultural agent and the FERA Work Secretary. In many cases it was necessary to interview several Drought Relief persons in a township before a man which appeared to be suitable for the survey was found. The foreman worked with each inspector individually before the inspector was permitted to proceed with the survey. The inspector was also given a sample of cultivated black currant which he carried with him, and if there was any question in his mind about the identity of certain Ribes, he was instrusted to compare his sample with the bush in question. The survey data was recorded on a township map. A sample of each cultivated black currant found by the inspector was given to the foreman as evidence of his findings.

Although an average Drought Relief worker completed the township assigned him in about 10 working days, usually it took approximately six weeks for a foreman to complete a county since much of his time was consumed in giving individual training to the inspectors.

The results of the surveys in Shawano, Douglas, Marathon and Wood Counties appeared sufficient in themselves to warrant starting similar projects in other counties as well. If relief labor is carefully chosen and supervised, it can be utilized in cultivated black currant survey work. However, it can be used only under strict guidance of a state foreman or Federal agent experienced in the work. The summary by counties is shown in Tables 78 and 79.

Table 78. - Summary of Black Currant Survey Work, Federal Emergency Relief Administration Program, Wisconsin, 1934.

County	Total Inspections	Locations Found	Ribes Nigrum: Bushes Found	Ribes Nigrum: Locations Destroyed	Ribes Nigrum: Bushes Destroyed	Man-hours Labor: FERA	Man-hours Labor: Drought Relief	Man-hours Labor: Total	Man-days for Supervision	Man-days for Sept Completed 12/31/34
Douglas	5,090	63	195		-	790		790	30	20
Marathon	6,595	59	209	5	95	216	884	1,100	51	75
Shawano	6,490	42	71	10	69	235	781	1,016	30	100
Wood	5,764	46	917	-	-	130	378	508	36	55
Totals	23,819	179	392	15	65	1,282	2,133	3,415	147	-

Douglas County 7 bushes
Marathon " 5 "
Jackson " 40 "
Washburn " 27 "
Total 79 bushes

In addition to R. Nigrum destroyed as shown in above table the following number of R. Nigrum bushes were destroyed in connection with local control and reported in local control tables.

Table 79. - Summary of Black Currant Survey Costs, Federal Emergency Relief Administration Program, Wisconsin, 1934.

County	Salaries and Subsistence: Labor: County	Labor: FERA	Labor: Drought Relief	Labor: Total	Supervision: FERA	Supervision: SRA	Supervision: State	Supervision: Total	Transportation* Supervision: CWA	Transportation* Supervision: State	Transportation* Supervision: Total	Total Cost
Douglas		384.[illegible]		385.10	117.00			117.00	25.45		[illegible]	509.[illegible]
Marathon	19.72	95.97	757.21	865.51		389.04		389.04	48.43		58.83	1,311.38
Shawano	31.26	178.54	396.00	605.50			185.27	185.39	36.01	11.00	47.01	791.18
Wood	25.95	51.90	382.15	456.00		169.12	91.02	260.14	50.46		50.46	736.60
Totals	76.93	585.31	1,535.46	2,196.91	117.00	557.16	276.29	950.55	150.47	11.00	191.45	3,376.12

*Laborers furnished their own transportation.

Control Studies

With the pressure of Emergency Conservation Work and Federal Emergency Relief Administration work there was a little time for control study problems. Work was continued with *Pinus Peuce* Griseb., commonly called the Macedonian pine, to determine whether this pine is or is not susceptible to blister rust under field conditions. Some foresters consider *P. Peuce* highly resistant to white pine blister rust. During the early spring of 1933 fifty of these pines were planted in a heavy blister rust infection center on the Menominee Indian Reservation. In order that relative comparisons of infections on other white pines could be made at the same time, some fifty *Pinus monticola* D. Don., the western white pine and fifty *Pinus Strobus* L. the northern white pine, were planted in the area as check plants.

Unfortunately for this study the area on which the plot was established was worked by an Indian Ribes eradication crew during the summer of 1934. Therefore the pines were merely exposed to heavy infection during 1933 and until the middle of the summer of 1934.

Casual observations were made on these pines on two occasions during 1934, but no infection was seen on any of them. It will be a year or more before infection can become visible on these pines; consequently, no statement concerning results can be made at this time.

Informational Activities

In order to acquaint the people of Wisconsin with white pine blister rust control, information on it, such as identification, immediate and potential damage, and the methods of control, is being brought to their attention. The medium for disseminating this information during 1934 was chiefly by direct contact. Each individual pine owner interviewed was given a USDA bulletin, Miscellaneous Publication No. 22 (Rev.), entitled "How Blister Rust Spreads and Destroys White Pine". All Civilian Conservation Corps workers and Emergency Relief Administration workers who were employed on this project during the year were given literature and instruction on blister rust and its control.

On several occasions blister rust men have found instances where the disease had made an inroad on a pine stand without the owner knowing just what was responsible for the damage. It is the desire of the blister rust organization to teach the pine owners of Wisconsin that each Ribes bush growing near a pine stand is a potential hazard to future pine crops and that white pine can become infected only when Ribes bushes are growing within infecting distance of the pines.

Methods by which blister rust information was distributed to people in the State, other than by direct contact with individual pine owners, was by talks and demonstrations to various groups of people, by newspaper articles, by the distribution of State and Federal publications, by demonstrations at ECW camps and at fairs, by radio talks, and by motion pictures.

1. Talks

(a) By blister rust foremen, on Plant Pathology, to classes of CCC boys in several of the ECW camps.

(b) To the Lions Club at Spooner, Wisconsin, by Agent H. R. Slevin, who emphasized the need for immediate action pertaining to control work in Washburn County.

(c) To the Wisconsin Junior Forest Rangers at their State meeting in Madison, Wisconsin, by the State Supervisor, who spoke on White Pine Blister Rust Control Work in Wisconsin.

(d) To several county boards, by District Agent Ray Weber and the State Supervisor, concerning the start of blister rust control FERA projects in their counties. County approval was necessary since the county furnished a portion of the funds used to pay FERA laborers.

2. Newspaper Articles

(a) Articles on blister rust were released several times during the year by the Wisconsin Department of Agriculture and Markets Press Bureau. Each of these releases was sent directly to 330 weekly papers and 38 daily papers.

(b) Articles of local interest were frequently given to newspapers in the communities in which local control work was in progress. At least one article and oftentimes several articles were published in the following papers: Adams Times, Antigo Daily Journal, Athens Herald, Bloomington Record, Clintonville Dairymen-Gazette, Cumberland Advocate, Loyal Tribune, Marshfield Journal, Merrill Daily Herald, Milwaukee Journal, Milwaukee Sentinel, Pittsville Record, Prairie du Chien Courier, Reedsburg Times, Shawano Leader-Advocate, Sparta Herald, Stevens Point Journal, Superior Telegram, Turtle Lake Times, Viroqua Censor, Wausau Record Herald and the Winter Gazette.

3. State and Federal Publications

(a) Diamond-shaped posters were placed in conspicuous places on protected pine areas, stating "These White Pines Have Been Protected from Blister Rust by the Removal of Currant and Gooseberry Bushes", which served to increase interest in blister rust control in a locality.

(b) Approximately 7,400 USDA Miscellaneous Publication No. 22 (Rev.) entitled, "How Blister Rust Spreads and Destroys White Pines", were distributed to pine owners chiefly.

(c) Some 100 bulletins on "White Pine Blister Rust, a Half Million Dollar Menace", by Charles Lathrop Pack, and about 420 USDA Miscellaneous Publication No. 27 on "Black Currant Spreads White Pine Blister Rust" were also distributed.

(d) Approximately 1,200 copies of the Wisconsin Department of Agriculture and Markets Bulletin No. 124, entitled, "Some of the More Important Insects and Plant Disease of Trees and Shrubs" were distributed to interested persons.

(e) White pine blister rust information was inserted in an application blank called, "Application for Trees for Forest Planting", issued by the Wisconsin Conservation Department. Anyone interested in purchasing seedlings from the Conservation Department's nurseries, located at Trout Lake, Wisconsin, and Wisconsin Rapids, Wisconsin, could obtain one of these blanks upon request.

(f) Approximately 4,000 blotters supplied by the Wisconsin Department of Agriculture and Markets were distributed during the year.

(g) An article entitled, "White Pine Blister Rust Control", was entered in the 1933-34 Biennial Report of the Wisconsin Department of Agriculture and Markets.

4. Demonstrations

(a) At several ECW camps.

(b) At the Jackson County Fair, Black River Falls, Wisconsin, on September 9-11, 1934.

(c) At the Wisconsin Valley Exposition and Fair, Wausau, Wisconsin, August 19-25, 1934.

(d) At the Wisconsin Outdoor Exposition, Madison, Wisconsin, July 2-8, 1934.

(e) At the Tri-State Fair, Superior, Wisconsin, August 20-26, 1934.

(f) At the Wisconsin State Fair, West Allis, Wisconsin, August [illegible] 1934.

5. Radio

(a) A talk, "White Pine Blister Rust in Wisconsin", was broadcast over radio station WHA, University of Wisconsin Station, at Madison, and WLBL, Stevens Point Station, by the State Supervisor.

6. Motion Pictures Made

(a) Winter and summer activities in white pine blister rust control work. Pine mapping activities were taken at the Smith Lake and Arbutus Lake State ECW Camps. Ribes eradication pictures were taken of State ECW, Indian ECW and FERA crews at work.

Costs

In Table 60 showing "State and Federal Expenditures for all Blister Rust Control Projects, Wisconsin, 1934" the item of $2,000 for State supervision was arrived at from the following:

Contributed Administrative Time (Salaries)		
E. L. Chambers, State Entomologist	$800.00	
Nursery Inspectors	500.00	$1,300.00
Contributed Space in State Buildings		
Office Space	$600.00	
Storage Space	100.00	700.00
Total Estimated State Contribution		$2,000.00

The item of $115.85 and that of $169.92 under BRC Agent Activities listed under FERA County Contribution and FERA Federal Contribution, respectively, combined represent the total expenditures for Dane County FERA office assistants in the Madison office.

NRA Supervision expenditures were computed by taking 50 percent of the State Supervisor's salary and expense. The NRA expenditure of $[illegible] listed under "Other Field Costs" is the total salary paid [illegible] from the Wisconsin allotment.

Whenever expenditures could not be allocated definitely under the captions Supervision, Ribes Eradication, Nursery Sanitation, Cultivated Black Currant Eradication, Field Data or Equipment and Miscellaneous they were listed under Blister Rust Control Agent Activities.

Table 60 shows the State and Federal expenditures for all Blister Rust Control Projects in Wisconsin during 1934. In Table 61 these costs are expressed as percentages with reference to the total expenditure by each agency or program. In Table 62 the same costs are expressed as percentages with reference to the total expenditures by the various agencies on a project.

Conclusion

The year 1934 ushered in a greatly enlarged blister rust control program in Wisconsin, made possible chiefly by increased funds appropriated by the State Department of Agriculture and Markets and by various Federal relief agencies operating in the State, chief of which were the Federal Emergency Relief Administration and the National Recovery Administration. During the year 32,580 acres of white pine and 3,383 acres of white pine planting sites were given protection from blister rust by the removal of 13,227,425 Ribes bushes from 145,356 acres of land. From 1920 to 1933, inclusive, 5,036,576 bushes were destroyed from 111,722 acres of land. Accomplishments for the 1934 season, therefore, were greater than all the work combined from 1920 to 1933 inclusive. Approximately 152,277 acres of white pine were mapped in pre-eradication surveys conducted during 1934.

Table 80 - State and Federal Expenditures for all Blister Rust Control Projects, Minnesota, 1934

Agency	Expenditure Classification	Supervision	B.R.C. Agent Activities	Ribes Eradication	Nursery Sanitation	Cult. Black Currant Eradication	Field Data: Pre-eradication Survey	Field Data: Checking	Field Data: Other Field Data	Equipment and Misc.	Total
State	Salaries	1,300.00	1,585.45	4,573.99		229.99	503.75	227.71			8,[illegible]
	Expenses	700.00	293.47	2,140.81		57.60	221.36	166.08		67.37	4,24[illegible]
	Total	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
Wisc. For. Crop Law	Expenses			168.00							
	Total			168.00							168.00
FERA County Contrib'n	Salaries		113.23	9,227.68		37.54					[illegible]
	Expenses			881.61							[illegible]
	Total		[illegible]	[illegible]		37.54					[illegible]
FERA Fed. Contrib'n	Salaries		169.92	41,893.93		702.21					[illegible]
	Total		[illegible]	[illegible]		[illegible]					42,765.36
Fed. Dr. Relief	Salaries					1,331.46					[illegible]
	Total					[illegible]					1,331.[illegible]
[illegible]	Salaries	1,906.27	4,40[illegible]	4,155.11		368.14	8,940.27	649.97	830.30		14,445.70
	Expenses	684.29	2,416.90	3,206.11		345.45	1,426.51	425.11		165.31	8,669.67
	Total	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
State ECW	Salaries	5,004.82	1,910.47	59,405.04	4,544.08		10,629.11	2,000.45			[illegible]
	Expenses	712.91	325.75	2,220.48	240.46		1,779.53	712.49			90,4[illegible]
	Total	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]			5,991.[illegible]
Forest Service ECW	Salaries		486.60	10,812.45	2,082.67		617.94	85.20			[illegible]
	Expenses		109.20	893.23	38.73		99.83	19.90			14,084.[illegible]
	Total		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]			1,150.95
For. Serv. ERO	Salaries			971.65	64.50						[illegible]
	Total			[illegible]	[illegible]						1,036.[illegible]
Indian Service ECW	Salaries	877.96		24,485.50	139.97		2,025.47	318.65			[illegible]
	Expenses	19.75		1,694.28	10.99		600.85	56.50			27,900.20
	Total	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]			2,282.[illegible]
[illegible]	Salaries		1,491.97	4.50	154.28		180.37	61.70			[illegible]
	Expenses		624.36		105.53		154.94	55.70			7,692.30
	Total		[illegible]	[illegible]	[illegible]		335.31	117.40			1,150.[illegible]
[illegible]	Salaries						7,401.49				[illegible]
	Total						[illegible]				7,401.[illegible]
Total	Salaries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
	Expenses	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 81. – Percent of each Project Expenditure spent by each Agency, Wisconsin, 1934.

Agency	Super-vision	Agent Activ-ities	[illegible]	[illegible] Sani-tation	C.D.C.	[illegible]	Checking	Field [illegible]	Equip-ment & misc.	Total
State	10.8	13.5	57.3		2.3	[illegible]	3.1		0.6	100
Wisc. Con. Comm.			100							100
County FERA		1.1	97.8		1.1					100
Fed. ERA		0.6	98.8		0.6					100
Fed. Drought					100					100
ERA	10.8	29.5	31.8		3.1	15.3	4.6	5.8	0.9	100
State-ECW	2.8	8.2	74.2	5.2		14.8	5.0			100
Fo-ECW		3.9	76.8	13.9		4.7	0.7			100
IS-ECW	2.9		86.7	0.5		8.5	1.3			100
FS-ERA			97.5	8.8						100
Techn. ECW		79.5	0.1	8.8		11.1	3.5			100
CWA						100				100
Total	3.8	6.1	75.3	3.0	1.4	11.5	2.0	0.2	0.1	100

Table 82. - Percent of each Agency Expenditure spent on each Project, Wisconsin, 1934

Agency	Super-vision	B.R.C. agent activities	Ribes eradication	Nursery sanitation	C.B.C. eradication	Pre-eradication survey	Checking	Field data	Equip-ment	Total
State	24.7	16.8	3.8		8.6	2.8	3.2		28.2	5.2
Wisc. For. Crop.			0.1							[illegible]
County FERA		0.8	5.4		2.9					[illegible]
Fed. FERA		1.1	23.5		30.8					17.6
Fed. Drought					45.6					5.6
CWA	30.6	45.4	4.5		10.9	13.2	22.5	100	71.1	9.7
State ECW	33.5	15.1	40.8	54.9		41.5	50.8			38.8
FS-ECW		4.0	6.5	28.8		2.5	2.2			3.3
FS-NRA			0.5	0.8						[illegible]
IS-ECW	11.0		14.9	6.0		3.3	7.4			12.1
Techs. ECW		10.6	.1	3.5		1.5	3.4			1.3
ORR						26.6				3.0
Total	100	100	100	1[illegible]	100	100	100	100	100	[illegible]

In cultivated black currant survey work 173 locations of cultivated black currants having a total of 892 bushes were discovered. A total of 28,319 properties were examined. Shawano County was completely covered, while Douglas, Marathon and Wood Counties were partly completed by December 31, 1934.

Approximately 25 percent of the valuable pine stands in Wisconsin were protected from blister rust at the close of the 1934 season. To protect the remaining 75 percent before serious injury occurs is the problem which now confronts citizens of the State. Because nearly all expenditures in control work are for labor, white pine blister rust control was and continues to be an ideal project for the use of relief funds.

White pine blister rust has now been found in 40 counties in Wisconsin which include almost the entire white pine growing region of the State. Several severe outbreaks of the rust not previously found were discovered during 1934. Where blister rust has become established within a pine stand it is almost a certainty that the young pines cannot survive long enough to reach a merchantable size for lumber if Ribes bushes are permitted to grow within infecting distance.

White pine is a forest species which, if safeguarded to maturity, has a decidedly favorable future. Relief labor used to the fullest extent in blister rust control not only will furnish worthwhile jobs to unemployed men but will help save one of Wisconsin's very important state resources.

BLISTER RUST CONTROL, MINNESOTA, 1934

History of Work

Blister rust control work started in 1917. From 1917 to 1919 efforts were concentrated in eradicating the disease from the state by the destruction of Ribes and diseased pines in the known infection areas. Late in 1919 the futility of entirely eradicating the disease was realized. From then until 1922 the limited amount of control work was confined to the protection of white pine areas by the local eradication of Ribes.

From 1923 to 1929 blister rust control work was limited to scouting for the rust and studying blister rust damage and Ribes regrowth by one of two men employed during the summer months.

In 1929 a permanent state leader was appointed to work under the administrative direction of the State Forester and to take direct charge of all blister rust control activities in the state under the authority of a blister rust control law enacted by the State Legislature. Under the general plan of work the state will aid pine owners by providing trained men to supervise the eradication of Ribes but the cost of actual eradication will be paid by the owners.

In 1932 only a limited amount of Ribes eradication work was performed. The chief activities in 1932 were concerned with determining the actual white pine acreage in the state, making pre-eradication surveys and plans for state local control and cooperating with the State Forest Service in planning for future cooperative control work to be done in each state forest district. Due to the large amount of acreage under public control and the recently increasing amount due to tax delinquencies, the local control problem is one largely of state and Federal concern.

Relief labor in 1933 and 1934 made available through ECW, NRA, CWA, etc. has made possible great strides in local control in the state and a high percentage of high priority white pine on both public and private lands has been given initial control.

Organization

Blister rust control work in Minnesota is organized under a Memorandum of Understanding, quoted in full below, between the Minnesota State Forest Service and the U. S. Department of Agriculture through its Division of Blister Rust Control. Under the general administrative direction of the Director of the State Division of Forestry, the state leader has charge of all blister rust control work in the state.

"MEMORANDUM OF UNDERSTANDING BETWEEN THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY, WITH THE STATE OF MINNESOTA THROUGH ITS COMMISSIONER OF FORESTRY AND FIRE PREVENTION

Cooperative Work in Controlling White Pine Blister Rust in Minnesota

"The object of the cooperative work outlined herein is to provide

for accomplishing the control of white pine blister rust in Minnesota.

"A. The United States Department of Agriculture, Bureau of Plant Industry will

(1) Arrange for the payment of the salaries and necessary travel expenses of one or more employees who shall conduct cooperative blister rust control work in Minnesota.

(2) Provide these employees with subject matter and technical information essential to the proper conduct of their work.

(3) Conduct experiments and demonstrations for the purpose of improving control practices.

(4) Obtain data on the spread of the rust, the interstate movement of host plants and the conditions under which they are grown commercially, to supplement federal blister rust quarantines in promoting the effective prosecution of the cooperative control work.

(5) Coordinate blister rust control activities in the several cooperating states by furnishing regional leadership and supervision.

"B. The State of Minnesota through the Commissioner of Forestry and Fire Prevention Will

(1) Assume the administrative direction of the aforesaid employees of the United States Bureau of Plant Industry.

(2) Cooperate with Counties, Townships, Associations, individuals and other pine owners in the application of local control measures on a basis satisfactory to the U. S. Bureau of Plant Industry.

(3) Provide such supervision and checking of local eradication of Ribes as will secure thorough removal of these plants.

(4) Undertake such destruction of white pines or Ribes in Minnesota and such enforcement of State laws as may be necessary for the effective prosecution of blister rust control work.

(5) Prepare an annual report of all blister rust control work performed under the provisions of this memorandum, one copy of which will be sent to each of the cooperating parties.

(6) Submit in prescribed form to the United States Bureau of Plant Industry a monthly report of salaries and expenses paid by the State on blister rust control work.

(7) Have all salary and expense vouchers to be paid out of federal funds approved by the man directly in charge of supervising cooperative blister rust control work in the State before being submitted to the United States Bureau of Plant Industry for payment.

"C. It is Mutually Agreed

(1) That the several undertakings of this Memorandum shall become

effective July 1, 1929, and continue in force until terminated at the option of either party by a written statement to that effect.

(2) That the cooperative plan of work outlined in this memorandum will best accomplish control of white pine blister rust in Minnesota.

(3) That all persons appointed by the United States Bureau of Plant Industry and its cooperators under this memorandum shall be satisfactory to the cooperating parties.

(4) That the results of the cooperative work may be published jointly, or upon mutual agreement, by either cooperating party, with due credit given to the cooperating agencies. All manuscripts shall be criticized by the cooperating parties before publication and all form letters, bulletins and any other circulars to be mailed in penalty envelopes shall be submitted in manuscript form for approval by the United States Department of Agriculture before being printed or sent out.

(5) That any expenditures involved in the work herein assumed by the United States Bureau of Plant Industry are contingent upon appropriations being made therefor by Congress, but no Federal funds shall be expended in compensation for host plants destroyed in control work.

(6) That for the fiscal year July 1, 1929, to June 30, 1930, the State of Minnesota, through its Commissioner of Forestry and Fire Prevention and its cooperators, will expend about $2,000.00 and the Federal Government in behalf of the United States Bureau of Plant Industry about $2,000.00 in connection with the work herein provided for. Beginning July 1, 1930, the amounts to be expended each fiscal year by the State of Minnesota through its Commissioner of Forestry and Fire Prevention and its cooperators and by the Federal Government in behalf of the United States Bureau of Plant Industry shall be agreed upon in writing and copies of the agreement shall be sent each of the signatories hereto.

"In witness whereof the parties hereto have severally signed these presents on the respective days and dates hereinafter set forth.

State of Minnesota

June 21, 1929 — (S) G. M. Conzet
By Commissioner of Forestry and Fire Prevention

July 10, 1929 — (S) K. F. Kellerman
Chief, Bureau of Plant Industry, U. S. Department of Agriculture

"AMENDMENT TO MEMORANDUM OF UNDERSTANDING
Effective July 1, 1929

Amendment No. [illegible]
Washington, D. C.

THE UNITED STATES BUREAU OF ENTOMOLOGY, AND THE STATE OF MINNESOTA THROUGH ITS COMMISSIONER OF FORESTRY AND FIRE PREVENTION

Cooperative Work in Controlling White Pine Blister Rust in Minnesota

"Whereas,

The Memorandum of Understanding described above contains the following paragraph (C-6):-

'That for the fiscal year July 1, 1929 to June 30, 1930, the State of Minnesota, through its Commissioner of Forestry and Fire Prevention and its cooperators, will expend about $2,000 and the Federal Government in behalf of the United States Bureau of Plant Industry about $2,000 in connection with the work herein provided for. Beginning July 1, 1930, the amounts to be expended each fiscal year by the State of Minnesota through its Commissioner of Forestry and Fire Prevention and its cooperators, and by the Federal Government in behalf of the United States Bureau of Plant Industry shall be agreed upon in writing and copies of such agreement shall be sent each of the signatories hereto.'

"And,

Whereas, the said cooperative work in controlling white pine blister rust in Minnesota has, by reorganization within the Department of Agriculture, been transferred to the Bureau of Entomology of said Department.

Now, therefore, in accordance with the foregoing provision and pursuant to such reorganization, it is mutually agreed that for the fiscal year July 1, 1934 to June 30, 1935, the State of Minnesota through its Commissioner of Forestry and Fire Prevention and its cooperators will expend about $3,100.00 and the Federal Government in behalf of the United States Bureau of Entomology about $66,000 in connection with the work herein provided for, provided, however, that the maximum expended by the Federal Government shall not exceed $67,000.

June 13, 1934	(S) G. M. Conzet Director of the Division of Forestry, Department of Conservation
July 1, 1934	(S) Lee A. Strong Chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture"

Blister Rust Control Areas

Blister rust control areas in which the planting, possession or movement of pines or Ribes is regulated, were authorized late in 1934. A description of this regulation appears following quoted in full from the 1934 Minnesota blister rust control report:

"BLISTER RUST CONTROL AREAS

"The state blister rust law, (session laws of 1929, Chapter 21[illegible]) places in the Department of Conservation authority to establish blister rust control areas wherein the planting and possession of currants and gooseberries is prohibited. The establishment of blister rust control areas will aid in preventing the replanting or additional planting of Ribes near white pine stands and white pine producing nurseries and will facilitate the removal of cultivated Ribes whenever necessary to secure the control of blister rust.

"The Commissioner's order of December 1, 1934, attached hereto, places essentially all of the Minnesota white pine areas as blister rust control areas. A. G. Ruggles, State Entomologist, issued an order dated February 25, 1935, establishing blister rust control areas around the white pine producing blocks of the J. V. Bailey and Lake City nurseries.

"The blister rust law provides only for the regulation of planting or possession of currants and gooseberries. The Department of Conservation has no authority to regulate the movement of shipments of currants and gooseberries. However, the Division of Nursery Inspection, Minnesota Department of Agriculture, has such authority. This Division's regulations, issued February 25, 1935, prohibit the shipment of currant or gooseberry plants into a blister rust control area unless shipment is accompanied by a currant or gooseberry planting permit issued by the Department of Conservation.

"Federal plant quarantine No. 63 was amended effective March 15, 1935, adding Minnesota to the list of States that require shipments of currants and gooseberries coming into the state to be accompanied by a control area permit. The permit tags prepared by the Bureau of Entomology and Plant Quarantine are issued by the Department of Conservation.

"Two types of permits are used for shipments moving into the state. The first, Form 415, is issued for specific shipments into the blister rust control areas. The second, Form 415-a, is used for shipments into those parts of the state outside the blister rust control areas. The out of state nurserymen wishing to use Form 415-a submit an application for a general permit. Upon the approval of this application by the Commissioner, a supply of [illegible] control area permit tags is sent him. He completes the entries on Form 415-a by adding the name and address of the shipment's consignee, and attaches it to the shipment of currants and/or gooseberries. He then fills out Form 415 and mails it to the Commissioner.

"The Bureau of Entomology and Plant Quarantine maintains rigid inspection of nursery stock moving in interstate shipments. Thus we have absolute control of shipments coming into the state and almost full control

of intrastate movement of currants and gooseberries into the blister rust control areas.

STATE OF MINNESOTA — St. Paul, Minnesota, December 1, [illegible]

DEPARTMENT OF CONSERVATION

"Whereas, a dangerous fungous disease known as white pine blister rust, Cronartium ribicola, Fischer, is present in this state, and whereas the suppression and control of this disease is being prosecuted within the state by eradicating wild and cultivated currants and gooseberries, alternate host plants of the disease,

"Now, therefore, I, E. V. Willard, Commissioner of Conservation of the State of Minnesota, by virtue of the authority vested in me by Session Laws of 1929, chapter 216, and Session Laws of 1931, chapter 186, do establish the following areas as blister rust control areas, wherein no currants and gooseberries of any species shall be planted without the written permission of this Department:

"Whitewater and Lindbergh State Parks and within [illegible] feet thereof; Cook, Lake, St. Louis, Itasca, Koochiching, Beltrami, Clearwater, Mahnomen, Becker, Hubbard, Cass, Crow Wing, Aitkin, Kanabec, Isanti, Chisago, Pine and Carlton Counties. That portion of Morrison County lying between the Mississippi River and United States Highway #10, including that portion of the city of Little Falls, lying east of the Mississippi River and Township 32 N, Range 19 W, 4th P.M., Washington County.

E. V. Willard, Commissioner

STATE OF MINNESOTA

Department of Agriculture, Dairy, and Food Insect Control, Nursery and Apiary Inspection

REGULATIONS CONCERNING THE ESTABLISHMENT OF BLISTER RUST CONTROL AREAS CONTIGUOUS TO THE LAKE CITY NURSERIES, LAKE CITY, MINNESOTA, AND TO THE J. V. BAILEY NURSERIES, NEWPORT, MINNESOTA

Made and promulgated February 26, 1935 - Approved by Attorney General February 28, 1935

"Whereas, a dangerous disease known as blister rust, Cronartium ribicola, Fischer, is present in the state, and

"Whereas, the suppression and control of this disease is being prosecuted within the state by the eradication of currants and gooseberries, alternate hosts of the disease, and

"Whereas, the production of disease-free white pine nursery stock is an

essential control measure;

"NOW, THEREFORE, I, A. G. Ruggles, State Entomologist and Inspector of Nurseries of the State of Minnesota, by virtue of the authority vested in me by Session Laws of 1929, Chapter 210, do establish the following blister rust control areas contiguous to the nurseries hereafter named wherein the possession, or planting of currants and gooseberries is prohibited, and within 3/4 mile of outside boundaries of such control areas the possession and planting of European black currant, (Ribes nigrum), or any of its horticultural varieties is prohibited.

Lake City Nursery Sanitation Zone and Control Area

The sanitation zone is located in and adjoining the village of Lake City, Minnesota, in Goodhue and Wabasha Counties with boundaries as follows: Starting at a point ¼ mile northwest on U. S. Highway No. 61 from its junction with Sugar Loaf road thence N. 56° 30' W. 27½ chains, thence [illegible] 30' W. 10 chains, thence S 1° 30' E. 14 chains, thence S 24° 00' E. 26½ chains, thence S 75° 00' E. 22½ chains, thence N 47° 00' E 60½ chains to Lake Pepin thence northerly along edge approximately 55 chains, thence N [illegible] 30' W, 5½ chains to point of beginning. Such boundaries are marked with white paint on trees and fence posts.

J. V. Bailey Nurseries Sanitation Zone and Control Area located in Washington County, Twp. 28 N, R 21 W & 22 W, with boundaries as follows: Commencing on Village Road, 1445 feet south from the junction of Village Road and Military Road, thence due east 1452 feet, thence due south 2000 feet, thence due west 2800 feet, thence due north 2000 feet, thence due east 1348 feet, to starting point on Village Road. Such boundaries are marked with white paint on trees.

State Entomologist and State Inspector of Nurseries

Approved:

Approved February 25, 1933
Harry H. Peterson, Attorney General

By ______________________
Assistant Attorney General

____
Commissioner of Agriculture

STATE OF MINNESOTA

DEPARTMENT OF AGRICULTURE DAIRY AND FOOD

Division of
Insect Control, Nursery and Apiary Inspection
University Farm, St. Paul

R. A. Trovatten, Commissioner
A. G. Ruggles, State Entomologist

Blister Rust Control Area
Circular 21
February 25, 1933

BLISTER RUST CONTROL AREAS IN MINNESOTA

[illegible]

"(Information for [illegible] inspectors only). White-pine blister rust control (Federal Quarantine No. 63)

"The following areas in Minnesota have been established as blister rust control areas effective December 1, 1936 (See attached list of areas).

"In effect this act provides that no currant or gooseberry plants shall be shipped into these areas without first obtaining a permit from the Commissioner of Conservation, State Office Building, St. Paul, Minnesota.

"Within these areas are certain sections in which currants or gooseberries may be planted and the Commissioner may issue permits for planting in such sections.

"Before any shipment of currants or gooseberry plants is made into the control areas the following procedure should be carried out.

Currants and Gooseberry Plants

"I. Apply to the Commissioner of Conservation, State Office Building, St. Paul, Minnesota, for a permit giving the name of purchaser, the number and varieties, and the legal description of the land where such are to be planted, i. e., lot or 40, Sec., T.R.

"II. The plants shall be entirely dormant and defoliated. If not, they shall be dipped (except the roots) just prior to shipment in a lime-sulphur solution of a strength of 4.5° Baumé. This solution is prepared by diluting 1 part of a concentrated lime sulphur solution of 32° Baumé with 8 parts of water.

"III. Attach the permit to each container carrying gooseberry or currant plants in addition to the regular inspection certificate.

5-leafed Pines

"Before shipping 5-leafed pines into these areas they must be accompanied by a Federal quarantine permit in addition to a valid state certificate.

"For shipments into blister rust control areas of the following states, write:-

Connecticut	—	State Entomologist, Agr. Exp. Station (New Haven)
Idaho	—	Director, Bureau of Plant Industry (Boise)
Maine	—	State Horticulturist (Augusta)
Massachusetts	—	Director, Div. of Plant Pest Control (Boston)
Michigan	—	Inspector, Orchard & Nursery Insp. Dept. (Lansing)
New Hampshire	—	State Nursery Inspector (Durham)
New York	—	Director, Bureau of Plant Industry (Albany)
Rhode Island	—	State Entomologist, 311 State House (Providence)
Vermont	—	Forest Commissioner (Montpelier)

List of Counties in Blister Rust Control Area:

Cook, Lake, St. Louis, Itasca, Koochiching, Beltrami, Clearwater, Cass.

Mahnomen, Becker, Hubbard, Cass, Crow Wing, Aitkin, Kanabec, Isanti, Chisago Pine and Carlton Counties. That portion of Morrison County lying between the Mississippi River and United States Highway #10, including that portion of the city of Little Falls, lying west of the Mississippi River and Township 32 N. Range 19 W, 4th P.M. Washington County. Nursery sanitation areas and control areas have also been established for the J. V. Bailey Nurseries and the Lake City Nursery.

A. G. Ruggles
State Entomologist"

Agencies Performing Control Work

Blister rust control work was performed in all cases under the direction of the state leader who is responsible for the work in the state. The following agencies participated in local control or allied phases of it in the following number of areas:

State ECW, [illegible] camps
State Parks ECW, 1 camps
Forest Service ECW, 6 ranger districts
Forest Service Nira, 2 ranger districts
Indian Service ECW, 5 general areas
ERA, 16 counties on areas not within
    jurisdiction of an ECW camp
Cooperative control, 3 county
CWA, 1 county

Table 65 lists the approximate number of men employed monthly by the various programs together with each month's output.

The work performed on Federal Forest Service and Indian Service land was under the direct supervision of a technician while work under the other agencies was directed by checkers who worked under the district agent, and in some cases the work was handled directly by the agent.

The results accomplished by these participating agencies is discussed in detail elsewhere in this report.

Blister Rust Infection

At the close of the year 1933, it was reported that white pine blister rust was present over essentially the entire range of white pine in Minnesota. During 1934 pine infection was found for the first time in Becker County. (Ribes infection was reported for the first time in this county in 1933). Becker County is on the western limit of the eastern white pine range. An examination of an area of 20 acres where the infection was general and well distributed showed that the white pine averaged 300-400 trees per acre, ranging in height from 1 to 15 feet. Of 600 trees examined, 136 or 23% were found infected. Thirty-nine of these trees had already been killed by blister rust or 29% of the infected pines were already dead. Infection was apparently chargeable to R. cynosbati, R. americanum and R. hirtellum scattered through the stand at the rate of approximately 500 per acre. The earliest infection present apparently dates back to 1925.

A new infection area was discovered on the Grand Portage State Forest in northeastern Cook County. Extremely heavy Ribes infection was noted on four species present, R. triste, R. hudsonianum, R. glandulosum and R. oxyacanthoides. Infection on the last named species was especially heavy. Pine infection, originating five to ten years ago, is also quite general. The area, NE¼ of the NW¼, S 33, T 65 N, R 5 E, is about two miles east of the Superior National Forest boundary and about 1½ miles south of the Canadian boundary. Ribes infection was found in adjacent portions of the Superior National Forest.

In Table 40 there is listed the present status of infection in the state as of 1934.

Pre-eradication Surveys

Before the planning of eradication activities can be started, accurate knowledge as to the location of white pine stands, their value, and estimates as to the cost of their protection must be available. It is the purpose of pre-eradication surveys to secure these data.

In 1932 for the first time a systematic effort to gather information as to the location of pine stands and the cost of their protection was made. Agent Dell mapped over 7,000 acres of pine in Crow Wing County in 1932.

During 1933 CCC blister rust checkers working out of State Forest and State Park Camps nearly completed the pre-eradication survey work in State Forests and Parks. The project was essentially completed on the Chippewa National Forest and the Red Lake Indian Forest the same year. On the Superior National Forest about 4,000 acres of white pine were mapped. On lands outside public forests 8,[illegible] acres had been mapped and placed on priority for protection.

Work was started in 1934 with eight men on Ribes pre-eradication surveys. Field work continued well toward the end of March. The remainder of March and the month of April was spent in putting the pre-eradication records in their final shape.

Early in June the personnel of the eastern district mapped 6,[illegible] acres of the Onigum Unit of the Chippewa National Forest. This area contains 7,[illegible] acres of pine of U. S. Forest Service, Indian Service and private ownership.

Because of inaccuracies in the original maps made in 1932, it was necessary to remap 7,068 acres in the Red Lake Indian Forest of which 7,[illegible] acres were pine.

On the Superior National Forest 7,[illegible] acres of pine was covered by pre-eradication surveys. A portion of this acreage was reported as work accomplished in both 1933 and 1934 as it was necessary to recheck some of the area in 1934 for which the 1933 data was secured from other forest surveys. There remains approximately 2,500 acres of pine in this forest to be examined.

This project is essentially completed on the Chippewa National Forest with only 2[illegible] acres of pine unexamined.

Table 84. - Present Status of Infection in Minnesota Counties Classified According to Year Infection First Found.--1934.

Year Ribes Infection 1st Found	Name of County	Ribes Infection Only	Ribes & Pine Infection: Year Pine Infection First Found 1916	1917	1918	1919	'25	'26	'27	'28	'29	'30	'31	'32	'33	'34	Total No. Counties
1916	Chisago		X														
	Washington		X														
	Hennepin*		X														
	Lyon*		X														4
1917	Steele*			X													
	Pine			X													
	Mower*			X													3
1918	Martin*				X												1
1919	Carlton	X															
	Anoka														X		
	Carver	X															
	Wabasha	X															
	Rice	X															
	Isanti					X											
	Mille Lacs												X				
	Aitkin					X											
	Kanabec					X											9
1920	Crow Wing								X								
	Itasca										X						2
1922	St. Louis						X										1
1925	Lake						X										
	Morrison													X			2
1930	Cass														X		1
1933	Cook														X		
	Beltrami														X		
	Becker														X		
	Clearwater															X	4
	Total 27	4	4	3	1	3	2		1		1		1	1	5	1	27

* Infection found on imported pine nursery stock only. - destroyed.

Pre-eradication surveys in the State Forests and Parks in the future will be essentially confined to the field work necessary to make planting plans that involve the use of white pine stock.

The aim of the original pre-eradication surveys was to secure accurate maps of pine placed in priority for protection and rough maps of the so called scattered pine. Therefore a considerable amount of work will be required to further refine the scattered pine data for lands outside of public forest boundaries.

Table 25 summarizes all pre-eradication surveys completed in the state during 1934.

According to latest estimates the acreage of white pine in Minnesota is as follows:

First Priority white pine	57,03[illegible] acres
Second Priority white pine	293,157 acres
Sub-total, White pine to protect	350,1[illegible] acres
Scattered white pine	586,4[illegible] acres
Grand total, White pine	[illegible] acres

Local Control

The 1934 eradication season started May 1 with a training school for Nira supervisory personnel at Afton. These men then returned to their respective districts and put their foremen through a course in eradication methods. The full Nira eradication force was in action beginning the week of May 14.

A training school for ECW personnel was held during the week of May 15 at Bena on the Chippewa National Forest. This school was attended by the State checkers, Park foremen, Chippewa National Forest checker and foremen, and Indian Service foremen.

The Nira funds were largely expended outside the boundaries of public forests and parks. However, the pine in several city parks was protected. The pine in Interstate and Lindbergh State Parks was protected by Nira crews. The entries in the Eradication Summary Table for Cook County represent work done in the Grand Portage State Forest. One small block of pine on the south boundary of the Cloquet Valley State Forest and the pine in the [illegible] State Forest was also protected with Nira crews.

The eradication summary table is prepared to show work done by the various agencies and funds participating in the eradication program. The actual amount of money spent by each agency for eradication and other product is given in the State and Federal Expenditure Tables.

Eradication methods are designed to secure the reduction of the Ribes population on areas worked to a minimum at the lowest possible cost. They

Table [illegible] - [illegible] Survey [illegible], 193[illegible]

County	No. of Projects	Acres Pine	Acres to Work: Crew	Acres to Work: [illegible]	Acres to Work: Total	Man Days: Crew	Man Days: [illegible]	Man Days: Total
				District [illegible]				
Chisago	6	684	1,386	100	1,486	206	41	[illegible]
Washington	5	718	[illegible]	-	1,429	280	[illegible]	[illegible]
Stearns	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total	11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				District [illegible]				
Lake	[illegible]	[illegible]	270	[illegible]	[illegible]	160	[illegible]	[illegible]
Carlton	5	86	184	333	517	90	45.5	[illegible]
St. Louis	9	286	798	765	1,563	90	51.5	[illegible]
Crow Wing	3	209	[illegible]	[illegible]	[illegible]	211	[illegible]	[illegible]
Sub-total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				District [illegible]				
Clearwater	21	129	2,881	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Beltrami	6	317	929	105	1,034	452	[illegible]	[illegible]
Wadena	3	37	180	[illegible]	[illegible]	92	42	[illegible]
Todd	2	38	100	180	285	84	59	[illegible]
Otter Tail	1	3	10	108	308	8	17	[illegible]
Becker	12	472	1,777	880	2,819	931	542	[illegible]
Crow Wing	2	206	[illegible]	250	454	[illegible]	33	[illegible]
Sub-total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Forest				State Forest [illegible]				
Finland	1	25	110	70	180	900	-	[illegible]
Caribou [illegible]	1	11	-	50	50	-	[illegible]	[illegible]
Camp Ripley	2	36	82	505	587	[illegible]	6.5	[illegible]
Sub-total	[illegible]	65	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				State Forest [illegible]				
Grand Portage	3	[illegible]	880	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				Federal Lands				
Red Lake Indian Forest		809	285	808	1,092	-	-	[illegible]
		[illegible] acres mapped including [illegible] acres white pine.						
Chippewa*		2,991	786	[illegible]	[illegible]	-	-	[illegible]
Superior		7,119	8,681	[illegible]	14,361	-	-	[illegible]
Total		[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
State Totals		16,757	22,680	[illegible]	[illegible]			[illegible]

* Survey made by U.S.F.S. personnel.

the Ribes present are scattered generally over the area being worked, a six man crew is used. The crew members working in line six to twenty feet apart systematically examine the area. Their foreman zigzags back and forth behind his crew looking for missed bushes, and keeping the men in alignment at varying distances apart as Ribes conditions vary. Ribes as found are pulled and hung in trees and brush so that their roots may dry out and die.

Where Ribes growth is localized on small locations such as swampy spots favorable for their growth, a 'scout' method of eradication is used. In the scout crew the men work up to 200 feet apart. Well trained crew men are essential for the scout crew. Often scoutable areas are worked by one or two men. Many areas, such as Jack pine, muskeg, pure black spruce and tamarack types are Ribes free. The pre-eradication survey data usually shows this fact. Cheap cotton string is used to mark strips as worked by the crew. The definite strip boundaries established by its use prevent the missing of any ground and the needless expenditure of energy in going over the same ground twice. While the string for a season's work represents quite an expenditure, the saving of time and increased crew efficiency more than justifies its use.

In Table 36 there is summarized all local control performed on public lands in Minnesota during 1934. Table 37 summarizes the work performed on private lands, both initial and second eradication for 1934.

Table 38 gives a summary by years of all local control performed since it was first started in 1918.

Status Local Control, Minnesota, December 31, 1934

Acres white pine to protect	355,436
Acres white pine initially protected to December 31, 1934	39,496
Percent acres white pine initially protected to date	11.11
Acres white pine given second protection to date	1,344
Acres white pine given second protection	0.38

Analysis of Ribes Eradication by Ribes Types

Prior to Ribes eradication, the areas to be worked are covered by pre-eradication surveys and divided into Ribes types. A Ribes type is a portion of an area in which Ribes and working conditions are fairly uniform. Ribes types recognized in Minnesota are the same as those used in the remainder of this region and have been described fully elsewhere in this report. In brief, these types are:

A - Live Swamp - Alder swamp, cedar swamp, tamarack-spruce swamp, etc. Ribes abundant.

B - Muskeg - Muskeg, peat, sedges, etc. Ribes usually absent except at edges.

C - Hardwoods - [illegible] hardwoods, [illegible] soils. Ribes usually numerous.

[illegible] Minnesota, 1934 [illegible]

County	Number of Proposals	Acres of Plan	Acres Served: Open	Acres Served: Brush	Acres Served: Total	Cost	[illegible]
[illegible] Valley	6	477	1,474	-	1,474	253,1[illegible]	-
[illegible]	1	159	279	[illegible]	319	[illegible]	[illegible]
[illegible]	1	48	170	-	170	[illegible]	-
[illegible]	1	11	-	50	50	-	[illegible]
[illegible] River	1	57	116	3	119	15,999	[illegible]
[illegible]	4	56	478	[illegible]	545	16,875	[illegible]
[illegible]	4	1,200	[illegible]	1,450	1,[illegible]	[illegible]	[illegible]
Fond du Lac	5	[illegible]	411	715	1,[illegible]	[illegible]	[illegible]
Sub-totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jay Cooke	4	606	1,613	-	1,[illegible]	[illegible]	
[illegible]	3	180	446	-	445	[illegible]	
[illegible]	4	153	[illegible]	-	[illegible]	[illegible]	
Itasca	5	[illegible]	298	1,[illegible]	1,[illegible]	[illegible]	[illegible]
Sub-totals	16	1,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	6	1,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Chippewa	15	[illegible]	[illegible]	[illegible]	[illegible]	525,[illegible]	[illegible]
Sub-totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
Superior	7	677	536	1,574	2,100	-	-
Chippewa	-	1,[illegible]	10	1,460	1,470	[illegible]	[illegible]
Sub-totals	-	[illegible]	[illegible]	[illegible]	[illegible]	-	
Superior Totals[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	-
Chippewa Totals[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total [illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	-	
Vermillion	1	75	306		306	117,150	-
Red Lake	8	6,336	3,113	6,948	10,[illegible]	[illegible]	-
[illegible]	4	1,116	[illegible]	[illegible]	1,[illegible]	[illegible]	[illegible]
Totals	13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

Table [illegible] Minnesota, 1936

County	Number of Projects	Acres of Type	Acres Planted: [illegible]	[illegible]	Total	Trees	[illegible]
Re-Cultivation							
Washington	8	316	1,125	[illegible]	1,138	180,841	[illegible]
Chisago	8	475	1,558	208	1,766	101,209	[illegible]
Sub-totals	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Initial Production							
[illegible]	1	99	502	15	518	88,250	[illegible]
Aitkin	8	378	1,112	488	1,688	51,388	[illegible]
Carlton	16	886	4,198	1,279	4,480	780,811	[illegible]
St. Louis	10	1,306	5,166	598	5,854	154,545	[illegible]
Lake	1	16	45	75	120	15,807	[illegible]
Cook	1	036	1,180	-	1,180	331,243	[illegible]
[illegible]	27	2,903	7,481.7	7,424.5	15,[illegible]	818,900	[illegible]
Cass	12	951	706	1,058	1,761	55,321	[illegible]
Itasca	4	35	194	116	313	17,250	[illegible]
Hubbard	11	573	1,276	275	1,551	180,237	[illegible]
Becker	8	1,390	600	1,920	2,520	185,553	[illegible]
Clearwater	15	171	2,091	104	2,755	137,780	[illegible]
Beltrami	5	410	727	200	925	80,187	[illegible]
Morrison	2	817	1,285	185	1,330	47,988	[illegible]
Sub-totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Grand Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Lake Vadnais	1	48	57	147	195	7,758	[illegible]
Duluth	1	5	5	5	10	10,441	-
Co-op Council	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
W.P.A.	1	5	5	5	10	[illegible]	-
SERA plus	-	[illegible]	[illegible]	[illegible]	[illegible]	-	-
CWA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	
State Totals	-	[illegible]	[illegible]	[illegible]	[illegible]		-

* Supervision on this project from Birr? funds.
plus -- Lake Vadnais & Duluth projects not included.

[illegible]	Man-Days: [illegible] Type	Seed	Total	Supervision: Type	Seed	Total	Grand Total	Labor	C O S T S: Supervision	Other	Total
[illegible]	[illegible]	1	877.2	75		75	317.8	1,075.78	188.75	45.05	1,[illegible]
[illegible]	743	13	[illegible]	[illegible]	[illegible]	10.9	572.5	1,079.50	[illegible]	[illegible]	1,[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	73	8	78	30	.5	10.5	101.5	[illegible]	[illegible]	7.50	[illegible]
[illegible]	377	27.5	800.1	30	1	74	906.5	1,070.18	111.54	49.15	1,[illegible]
[illegible]	750.1	22.7	802.6	25.7	7.6	31.3	993.9	[illegible]	511.70	110.40	[illegible]
[illegible]	[illegible]	8.1	[illegible]	10.2	.8	11.5	500.1	1,130.32	54.[illegible]	37.15	1,[illegible]
115	87.2	9	[illegible]	11	10	21	[illegible]	130.85	103.64	8.00	[illegible]
[illegible]	111	-	808	10	[illegible]	[illegible]	854	3,[illegible]	438.95	894.31	[illegible]
[illegible]	1,875.05	54.17	2,[illegible]	114.25	18.75	127.5	2,510.9	[illegible]	858.70	553.08	[illegible]
[illegible]	206.5	84.6	263	11.75	6.75	18.5	418.5	1,380.51	176.45	99.30	1,[illegible]
[illegible]	48	6.5	58.5	6	2	7	58.5	[illegible]	50.46	23.45	[illegible]
36	367.5	22.75	440.25	17	4.5	22.5	461.75	1,609.95	125.50	51.81	[illegible]
37	867.05	106.75	964.5	34	13	48	586.5	1,343.72	405.45	104.00	[illegible]
[illegible]	714	24.3	736.3	39	10.5	20.5	885	2,730.63	474.77	54.80	[illegible]
14	145.8	8.5	200	10.25	1.75	12	714	470.64	74.90	80.40	1,[illegible]
1.5	307	16	388	11.75	1.25	20	406	1,250.04	105.92	34.80	1,[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] CONTROL											
32	13	12.8	38.8	2.5	1.8	1	32.5	[illegible]	*50.00	6.10	[illegible]
[illegible] ADMINISTRATION											
[illegible]	2	7.8	39.8	-	-	-	39.8	121.08	-	-	121.[illegible]
[illegible]	[illegible]	11.7	[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	-	-	-	[illegible]	[illegible]	-	-	[illegible]
[illegible]	-	-	[illegible]	-	-	[illegible]	[illegible]	-	-	-	[illegible]
[illegible]	[illegible]	-	[illegible]	-	-	[illegible]	[illegible]	-	-	-	[illegible]
[illegible]	[illegible]	-	[illegible]	-	-	[illegible]	[illegible]	-	-	-	[illegible]

** Includes $15.75 Labor from Birr? funds.

Table 88. - Summary of Local Control by Years, Minnesota, 1918 to 1934 Inc.

	Acres Worked			Total		Per Acre	
Year	Initial	2nd Trt.	Total	Bushes Pulled	Total Cost	Cost	[illegible]
1918	1,800	0	1,800	80,000	$7,000.00	$3.89	[illegible]
1919	2,440	0	2,440	158,204	[illegible]	[illegible]	[illegible]
1920	677	0	677	190,615	6,360.05	[illegible]	[illegible]
1921	989	0	989	24,775	287.78	[illegible]	[illegible]
1922	75	0	75	904	35.70	.48	[illegible]
1930	1,188	[illegible]	[illegible]	77,890	806.74	[illegible]	[illegible]
1931	478	264	742	143,197	1,174.98	[illegible]	[illegible]
1932	154	45	199	26,075	[illegible]	[illegible]	[illegible]
1933	18,511	80	18,591	1,541,377	16,828.61	[illegible]	[illegible]
1934	89,053	1,907	91,960	27,330,859	133,960.15	[illegible]	[illegible]
Total	[illegible]	[illegible]	97,340	[illegible]	[illegible]	[illegible]	[illegible]

D - Pine - Jack pine, Norway pine, white pine, often aspen. Soil sandy. Ribes absent to few.

E - Pasture - Cut over, grazed lands. Ribes vary, often large bushes.

F - Cultivated - Cultivated fields and meadows. Ribes absent except along fence rows, stone piles, etc.

A partial analysis of Ribes eradication by Ribes types is shown in Table 89.

Note in Table 89 that for all programs 9.0% of the area worked was type "A". On this small portion 37.0% of Ribes bushes were pulled at a cost of 24.9% of man days.

The average number of hours worked per man day under the NIRA program was seven and one half on the job, while for the various ECW programs the men worked an average of six hours on the job. It is apparent from Table 89 that, even with the difference in hours worked per man day, the men working under the NIRA program accomplished more in the matter of Ribes pulled in each Ribes type than the other programs with one possible exception. In "C" type, more Ribes per man day were pulled by the ID-ECW than the NIRA. The Ribes on the Indian Reservation were, however, six times more numerous than on areas worked under NIRA in "C" type.

Attention is directed to the excellent accomplishments under the ID-ECW program, which ranked second to NIRA, followed by the State ECW and FS-ECW.

Checking

The potential pine damaging power of the Ribes present in or near a pine stand tends to vary directly as to the Ribes leaf surface present. This can be most readily measured in terms of feet of live or leaf bearing stem. The purpose of Ribes eradication is to reduce the Ribes population to a minimum, thereby reducing the potential blister rust damage to white pine to a minimum. From a practical standpoint the complete elimination of Ribes from an area is impossible. The regional minimum standard of eradication efficiency permits leaving twenty-five feet of Ribes live stem per acre.

During the 1934 season check plots in the amount of 1,00[illegible] acres were run. The average number of bushes remaining on this acreage was 4.08 per acre. The average feet of live stem remaining per acre was 7.85. In Table 90 the Minnesota 1934 checking results are summarized.

Nursery Sanitation

Nursery sanitation was performed at two commercial nurseries, one National Forest and one State Forest nursery in 1934. The commercial nursery (The Lake City) and the one Federal Forest Service nursery (The Lydick) have received [illegible] white pine shipping permits for stock [illegible]

Table 69. - Analysis of Ribes [illegible]
Minnesota, 1934.

Ribes Type	Numbers: Acres Worked	Numbers: Ribes Pulled	Numbers: Total Man-Days	Percent of Total: Acres Worked	Percent of Total: Ribes Pulled	Percent of Total: Total Man-Days	Ave. per Acre: Ribes	Ave. per Acre: Man-Days	Ribes Pulled per Man-Day
				Forest Service ECW and FS-ERA					
A	1,084	965,039	5,150	12.0%	60.2%	42.9%	990	5.89	208
B	224	14,044	147	2.5	0.9	2.0	63	0.65	97
C	3,847	406,679	2,455	42.5	25.4	32.7	106	0.63	167
D	3,884	214,215	1,605	43.0	13.4	21.3	55	0.41	138
Total	9,034	1,597,985	7,5[illegible]	100.0	100.0	100.0	177	0.81	213
				Indian Service ECW					
A	751	1,372,801	2,911	5.9%	30.7%	31.4%	1,828	3.94	501
B	63	0	5	0.5	0	0.1	0	0.08	0
C	4,939	3,099,370	4,840	37.1	69.3	68.1	634	1.00	640
D	7,208	195	20	56.5	Trace	0.3	Trace	Trace	10
Total	12,960	4,472,366	7,076	100.0	100.0	100.0	[illegible]	[illegible]	[illegible]
				State ECW					
A	1,009	770,534	2,061	11.7%	31.9%	21.6%	686	1.73	374
B	175	8,012	139	1.7	0.3	1.4	46	0.79	58
C	5,238	1,369,831	6,319	51.3	56.7	65.0	217	1.20	218
D	1,932	225,691	932	18.8	9.3	9.6	118	0.48	240
E	819	142,210	844	7.1	1.9	8.8	169	1.11	170
F	458	1,063	30	4.4	Trace	0.3	2	0.07	34
Total	10,256	2,414,[illegible]	7,[illegible]	100.0	100.0	100.0	[illegible]	[illegible]	[illegible]
				[illegible]					
A	2,547	1,750,680	2,329	5.4%	39.4%	27.4%	636	0.88	752
C	14,691	1,555,307	3,245	46.5	35.5	38.8	106	0.22	477
D	12,032	912,910	2,516	38.0	20.0	29.9	80	0.21	364
E	2,307	134,555	309	7.3	3.1	3.7	60	0.14	438
Total	31,577	4,351,[illegible]	8,416	100.0	100.0	100.0	139	0.27	[illegible]
				All Programs					
A	5,660	4,840,354	7,739	9.0%	37.6%	29.9%	857	1.37	627
B	462	22,939	288	0.7	0.2	0.8	46	0.62	79
C	29,549	6,428,749	16,389	46.4	49.9	51.8	218	0.57	385
D	26,039	1,403,918	5,099	39.3	10.9	15.8	55	0.20	277
E	3,658	176,945	653	5.9	1.4	1.7	98	0.22	270
F	453	1,083	30	0.7	Trace	0.1	0	0.07	34
Total	[illegible]	[illegible]	[illegible]	100.0	100.0	100.0	[illegible]	[illegible]	[illegible]

Table 90 - Summary Minnesota, Checking, 1934

	Acres Worked	Acres Checked	Ribes Total Bushes	Ribes Total F.L.S.	Ribes Per Acre Bushes	Ribes Per Acre F.L.S.
			State and Private Lands			
ERA	41,619	600.66	2,357	4,217.49	3.92	7.02
State ECW	5,417	48.38	342	445.85	7.00	9.19
State Park ECW	4,905	[illegible]	513	[illegible]	9.52	10.99
			Indian Service ECW			
Vermillion Ind. Resv.	206	1.60	8	14.94	4.40	9.30
Red Lake Ind. For.	4,652	78.30	1,057	1,143.18	13.50	14.60
Onigum Unit	1,549	22.50	74	99.00	3.30	4.40
			National Forests			
Chippewa ERA (Onigum)	1,430	66.00	218	319.20	3.30	5.70
Chippewa ECW	5,383	19.60	45	41.38	2.30	[illegible]
Superior ERA and ECW	5,699	123.71	461	1,187.50	3.70	[illegible]
State Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

in the fall of [illegible] and spring of 1954, practice, of course, the healthy condition of the [illegible] stock is maintained throughout the life of the stock in the nursery.

Table [illegible] shows an itemized [illegible] of the work done at the [illegible] nurseries in 1954 while all nursery sanitation work from 1930-1954 is summarized in Table [illegible].

Black Currant Eradication

The European or cultivated black currant, *Ribes nigrum*, L., is the most susceptible Ribes species found in Minnesota. Therefore Minnesota white pine stands cannot be adequately protected from blister rust without eliminating *R. nigrum* from their areas.

The black currant eradication project in Minnesota started on September 22. The season closed December [illegible]. During this period the project was completed on the [illegible], Washington and [illegible] State Forests and the Chippewa National Forest. With the exception of one township the project is completed in that portion of the Superior National Forest boundaries within Cook County.

Results of the cultivated black currant eradication program are tabulated in Table [illegible]. The work done in 1954 was the first of this nature attempted in the state.

Informational Activities

The purpose of informational activities is to disseminate information concerning blister rust and methods used in its control; to create an active interest in control work; to facilitate black currant eradication; and to secure such maintenance of control by pine owners.

The informational mediums are:

Newspaper and magazine articles	Fair and exhibit demonstrations
Store window displays	Lectures and talks
Individual contacts and field demonstrations	

Herewith follows a summary of informational activities for the year of 1954:

Newspaper releases: 73 (estimated)
Magazine articles: 1 (Minnesota Conservation [illegible])
Demonstrations:

Place	Attendance
State Fair	300,000
Clearwater County Fair	2,000
East Polk County Fair	4,000
[illegible] County Fair	1,000
[illegible] Garden and Flower Show	1,000
National [illegible] Convention	4,500
	[illegible]

Table 91 - Nursery Sanitation, Minnesota, 1934

Nursery	Working	Acres Worked	Ribes Pulled: Cult.	Ribes Pulled: Wild	Man-days: Labor	Man-days: Super.	Man-days: Total	Costs: Labor	Costs: Supervision	Costs: Other	Costs: Total
		Regular (Supervision furnished using owner's laborers)									
Bailey	2nd	380	-	970	20	12	32	$ 31.50	$ 69.25	$12.80	$ 11[illegible]
Lake City	"	290	-	3,753	35	13	[illegible]	38.00	101.08	9.94	1[illegible]
		(Supervision furnished using State ECW labor)									
Cloquet	3rd	8	-	764	10	1	11	24.50	10.00	-	34.50
ECW	"	45	-	34,000	45	ECW 5	[illegible]	1[illegible]5.00	30.00	4.80	1[illegible]
Badoura	"	320	-	17,047	45	5.5	50.5	155.[illegible]	37.65	12.04	[illegible]
		(Supervision furnished using F.S.-ECW labor)									
[illegible]	1st	400	304	539	38	ECW 25	63	114.00	129.50	17.25	[illegible]
	2nd	-	112	80	1	11	12	3.00	58.4[illegible]	1.74	64.[illegible]
Totals		1,349	1,016	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 37 - Summary, [illegible] 1930 - 1935

Name	Location	Ownership	Number of Farmers	[illegible]	Year	[illegible]	[illegible]	[illegible]	[illegible]	Regular Federal	State	[illegible]	Other	Total	Remarks
[illegible]	Newport	[illegible]	[illegible]	1st	[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
"	"	"		2nd	[illegible]	[illegible]	[illegible]	0	0	[illegible]	0	[illegible]	[illegible]	[illegible]	" "
Lake [illegible]	Lake [illegible]	[illegible]	10	1st	[illegible]	[illegible]	[illegible]	0	0	55.66	345.67	100.00		500.20	[illegible]
" "	" "	"		2nd	[illegible]	[illegible]	[illegible]	0	0	[illegible]		[illegible]	[illegible]	[illegible]	" "
[illegible]	[illegible]	[illegible]	10	1st	[illegible]	[illegible]	[illegible]	[illegible]	0	10.00	[illegible]	[illegible]		10.00	[illegible]
"	"	"		2nd	[illegible]	[illegible]	[illegible]	[illegible]	0	85.32	38.00	16.00		139.32	[illegible], 1935
[illegible]	[illegible]	County	5	1st	1931	[illegible]	[illegible]	0	0	54.58		470.00		[illegible]	
"	" "		Unpaid		1932	[illegible]	[illegible]	0	0	61.00	5.00	42.75		98.75	
Cloquet	For. Exp. Sta.	State	30	1st	1930	[illegible]	[illegible]	[illegible]	0	30.12	12.00	76.30		118.42	Work done by greatly
"	" " "	"		1st	1930	[illegible]	[illegible]	[illegible]	0	19.35	10.00	73.35		101.60	by college students
"	" " "	"		1st	1931	[illegible]	[illegible]	[illegible]	0	10.00	5.00	30.30		45.30	
"	" " "	"		1st	1932	100	[illegible]	237.00	0	12.00	5.00	22.10		276.10	
"	" " "	"		2nd	1934	[illegible]	[illegible]	151.50	0	30.00	0	0	[illegible]	206.12	
[illegible]	[illegible]	State	10	1st	1930	[illegible]	[illegible]	185.00	0	0	77.00	14.50		280.70	
"	"	"		1st	1934	[illegible]	[illegible]	185.00	0	35.18	0	0	[illegible]	310.07	[illegible]
[illegible] Lake		State	20	1st	1935	[illegible]	[illegible]	37.50	0					37.50	[illegible]
[illegible] Lake	[illegible] Lake	[illegible]	10	1st	1930	[illegible]	[illegible]	0	[illegible]	76.73	30.00			106.73	
" "	" "	" "		2nd	1931	50	[illegible]	0	0	10.85	110.55	34.00		155.90	Includes State [illegible]
" "	" "	" "		3rd	1932	[illegible]	[illegible]	0	0	40.00	60.00	47.00		147.00	[illegible]
" "	" "	" "		4th	1935	[illegible]	[illegible]	0	575.70	17.00	[illegible]			[illegible]	Total $170.00
[illegible]	[illegible] Lake	[illegible]	20	1st	1934	[illegible]	[illegible]	0	117.00	176.86			32.04	301.30	
Total			[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

Table [illegible] - Cultivated Black Currant Eradication, Minnesota, [illegible]

Area	Locs. Checked	R. Nigrum Found		R. Nigrum Bushes		Other Ribes Found		Miles	Man-
		Locations	Bushes	Pulled	Not Pulled	Locations	Bushes	Traveled	hours
Grand Portage S. F.	219	10	119	119	-	55	598	898	[illegible]
Superior N. F.	441	49	359	213	146	148	1,859	1,078	[illegible]
George Washington S. F.	542	2	40	40	-	87	641	1,965	[illegible]
White Earth S. F.	427	-	-	-	-	40	553	1,469	[illegible]
Chippewa N. F.	339	-	-	-	-	42	691	1,401	[illegible]
Two Harbors	704	-	329	327	-	-	1,096	-	100.00
Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 33. - Percent of each Agency Expenditure spent on each Project, Minnesota, 1934.

Agency	Supervision	[illegible] agent activity	Ribes Eradication	Nursery Sanitation	Cult. B.C. Eradication	Pre-erad. Surveys	Checking	Other Data	Total
State	48.3	21.6	4.9	20.1		5.1			100.0
NRA & Reg.	12.2	7.0	59.5	0.8	3.8	7.2	1.0		100.0
For. Ser. NRA		0.6	97.7	0.6		0.2	0.9		100.0
State ECW			93.0	[illegible]		[illegible]			100.0
Park ECW			100.0						100.0
For. Ser. ECW		0.6	92.8	[illegible]		3.4	2.1		100.0
Ind. Ser. ECW	9.6	1.2	87.4			0.9	1		100.0
Tech. ECW	15.2	58.8				6.5	15.5	3.8	100.0
CCC			100.0						100.0
Total	[illegible]	6.1	[illegible]	[illegible]	[illegible]	4.1	1.1	[illegible]	100.0

Table 95. - Percent of each Project Expenditure spent by each Agency, Minnesota, 1934.

Agency	Supervision	B.R.C. agent activity	Ribes Eradication	Nursery sanitation	Cult. R. C. Eradication	Pre-eradication surveys	Checking	Other data	Total
State	12.3	7.9	0.1	37.0		2.7			1.9
ERA & Reg.	63.7	59.1	32.6	31.0	100.0	67.1	35.8		38.4
For. Ser. NHA		0.5	5.3	2.7		0.2	3.6		4.7
State ECW			10.9	11.7		11.9			10.1
Parks ECW			14.7						11.[illegible]
For. Ser. ECW		1.3	13.4	17.6		12.9	29.6		16.0
Ind. Ser. ECW	20.2	3.6	17.3			2.0	5.6		15.[illegible]
Tech. ECW	3.8	26.8				3.2	25.4	100.0	5.1
ERA			0.1						0.2
Totals	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Speeches and Talks	No.	Attendance
Division of Forestry	157	34,112
L. W. Ritter	1	8000

Roadside Demonstrations

The panels in the roadside demonstrations in Jay Cooke and Itasca State Parks were replaced.

Costs

In Table 94 costs of all blister rust control activities in Minnesota are tabulated according to the phase of the program and the agency indulging in the various phases. The agency's expenditures are also broken into salaries and expenses. It will be noted that the expenditures and contributed services evaluated total $140,440.72 for the calendar year 1934.

The same figures of costs are given in Table 95 but are expressed in percent of each agency expenditure spent on each phase or project in the control program.

In Table 96 these costs are expressed as the percent of each project expenditure spent by each agency during 1934 in Minnesota.

Conclusion

Among the accomplishments in blister rust control in Minnesota in 1934 three deserve special mention.

1. The establishment of blister rust control areas was accomplished in which, under the state session laws of 1933, the Director of the Department of Conservation can designate certain areas as control areas, and prohibit the planting or possession of Ribes. The entire white pine area in Minnesota was made a blister rust control area. In addition, several nurseries growing white pine and protected against the rust, outside the white pine area, were also declared as blister rust control areas.

2. The greatest amount of control work was accomplished in 1934 of any year to date, due chiefly to the use of Nira funds for labor, and the continued use of CCC men on control work.

3. Cultivated black currant elimination was started systematically for the first time in the state. This work was done in the fall and resulted in the elimination of cultivated black currants from the White Earth, George Washington and Grand Portage State Forests, the Chippewa National Forest and most of the Superior National Forest.

History of Work

Previous to 1933, blister rust work in Iowa was confined to scouting for the disease and tracing down shipments of pines from nurseries known to be infected.

Work started in the state in 1916, when a survey was carried on by Federal agents in cooperation with the State Entomologist. No blister rust was found.

In 1917, a more intensive survey was conducted by four different Federal agents in cooperation with the State Entomologist. The total scouting time of the Federal agents amounted to six and one half man months. One blister rust infection was found on <u>Pinus flexilis</u>, in shipment from a Minnesota nursery in 1915 to a farmer in Larchwood, Lyon County, in the extreme northwestern corner of the State. This infected pine was destroyed and steps were taken by the State Entomologist to destroy the other pines in the same lot. The whole state was covered in the survey during which 432 inspections were made in 139 towns.

No blister rust survey was made in Iowa in 1918.

In 1919, blister rust scouting work was carried on by two Federal agents in cooperation with the State Entomologist. The entire State was again covered. Since it was impossible to cover all plantations, those less than 25 years of age were given preference.

No blister rust was found in the State, although 614 white pine plantations, exclusive of nurseries, were examined.

The white pine plantation near Larchwood, Lyon County, which was found to be diseased in 1917 was removed and burned. A second plantation of white pine at Stacyville was voluntarily destroyed in 1919 by the owner.

In addition to the scouting for white pine blister rust in 1917, information was also gathered relative to the species and distribution of native Ribes in the State.

Very little scouting for blister rust was done in Iowa from 1919 until 1929. In 1929, [illegible] Guthrie, Assistant Entomologist, found one European black currant quite heavily infected in Snyder's Nursery at Center Point in Linn County in the east central portion of the State. This bush was destroyed shortly after discovery. Later in the fall of 1929, five heavily infected cultivated black currants were found at West Union in Fayette County in the northeastern portion of the State and 20 cultivated black currants were found heavily infected in Ames in Story County, in the center of the State. In 1929, scouting emphasis was placed on the inspection of the cultivated black currant. [illegible] eight plantings representing a total of 391 bushes were examined.

No scouting was done during 1930.

During 1931, a short scouting trip by Messrs. Sheals and Pierce was confined chiefly to the northeast quarter of the State. No blister rust was found on Ribes in the 35 inspection points. However, a blister rust canker, positively identified as such by the Division of Forest Pathology, was found on a pine in the College Nursery at Ames, growing within approximately one-third of a mile from the black currants previously found to be infected and destroyed in 1929. It is very probable that this single canker was of 1929 origin.

During 1932, a very limited amount of scouting was done. The pines in the nursery at Ames were examined at various times by college authorities. On October 11 to 12, 1932, 7,660 pines were examined and found free from blister rust. The black currant bushes at West Union found infected in 1929 were again examined in 1932. They were not infected. The vicinity of the infected black currants found in 1929 was also examined and no infection located. Several black currant plantings in Clinton, Iowa, were examined in the fall by Messrs. Detwiler and Putnam and found free from the rust.

In the spring of 1932, a limited amount of local control was performed in the town of McGregor in Northeastern Iowa on an area owned by the U. S. Biological Survey. The Ribes eradication work was done by Junior Forester Miller of the U. S. Biological Survey and three assistants who spent one day in removing wild Ribes for a distance of 900 feet from two large white pine trees. They pulled 2,000 Ribes and covered about 50 acres.

The Ribes eradication work was occasioned by the finding in early April of two suspected blister rust cankers on two of the large white pine trees on growth of 25 to 30 years old. These suspected cankers were cut and burned. Miller stated that the growth beyond the injury had been killed. No signs of aecia but a constriction was present in the center of each canker.

Ritter and Putnam examined these trees in late June of 1932, but failed to find any other signs of blister rust. They also checked on the Ribes eradication work and although thousands of sprouts and seedlings were present, no old bushes were found that were missed by the crew. In the fall of 1932, Putnam again examined the area for blister rust on Ribes and pines, but found none.

The only other control activity in Iowa in 1932 was a pre-eradication survey made around the Earl Ferris Nursery at Hampton, Iowa, and a small amount of Ribes eradication work done on October 17 and 18 around this nursery.

On the Tama Indian Reservation a pre-eradication survey was made around plantings of approximately eight acres of white pine.

On about the first of July, 1933, several Pathologists were assigned to various Emergency Conservation Work camps in various parts of the State. Actual Ribes eradication work was performed under the ECW in only three locations; viz., Pine Hollow, Dubuque County; Boone City Park, Boone County

and a limited shelterbelt area in Lucas County. Ninety-one acres of white pine were protected by removing a total of 21,856 Ribes from 1,608 acres. Four hundred two man days of labor and 42 man days of supervision were employed at a total cost of $1,418.00.

Early in October, 1933, a Memorandum of Understanding was agreed upon and signed by representatives of the United States Department of Agriculture, Bureau of Plant Industry; Forestry Sub-Section, Iowa Agricultural Experiment Station; the Experiment Station Plant Pathologist, and the State Entomologist. Professor MacDonald, Head of Forestry, Iowa State College, was named as State Cooperator.

On November 1, 1933, a Blister Rust State Leader was appointed in Iowa. Pre-eradication surveys were carried on during the month of December under the supervision of the State Leader and using both ECW and CWA funds. The total cost of CWA pre-eradication and shelterbelt census work amounted to $1,506.05. Four thousand eight hundred seventy three coniferous areas and 794 white pine areas were reported in 10 counties, none of which was completely covered by the December, 1933, survey.

During 1933, although nearly 10,000 white pines were examined by 16 ECW Pathologists and one blister rust checker hired on ECW funds, throughout the State, no infection was found.

No infection was found on either pines or Ribes during 1933.

Status of the Rust

Blister rust was found in but one location in Iowa during 1934. Infection on both Ribes and pine was found in this location. Following is a record of this infection:

Ribes infection

Found by Kenneth Burnett, ECW checker
Date: July 5, 1934
Location: SW¼ NE¼, Section 8, T 90 N, R 2 W, Dubuque County, Iowa
Species: *Ribes cynosbati*
Number infected: 16 bushes (infection spotted, the area being of rather heavy Ribes conditions)
Identification of *C. ribicola* verified by Mr. G. L. McNew under the direction of Dr. I. E. Melhus, Iowa State College.

Pinus strobus infection

Found by Burnett and Lubberts
Date: July 11, 1934
Location: SW¼, NE¼, Section 8, T 90 N, R 2 W, Dubuque County, Iowa
Infection found on one pine, six years from the seed, infection three or four years old, three cankers.
Identification of *C. ribicola* verified by Mr. G. L. McNew, under the direction of Dr. I. E. Melhus, Iowa State College.

The area was carefully scouted in July by Lubberts and Burnett, and again in September by Putnam, Franklin and Lubberts, but no further infection was found.

Numerous infection suspects were sent to the State Leader from time to time during the field season, from various parts of Northern Iowa, but none were found infected with the rust. Most of the suspects were referred to the Pathology Department, Iowa State College, for verification.

The black currants previously found infected in 1929 were examined in the fall of 1934, but no infection was present.

Thirty three white pine plantings originating from the Iowa State Nursery, Ames (where pine infection was found in 1931) were examined during December, 1934. One thousand nine hundred eighty five trees were examined, but no infection was found. More of these plantings will be inspected during early 1935.

The status of infections found in Iowa are shown in Table 37.

Organization

In 1933 a Memorandum of Understanding was agreed upon and signed by the cooperating agencies for control work in the State. It, together with the fiscal year 1934 amendment, follow:

Table 97. - Status of Present Infection in Iowa Counties Classified According to Year of Infection First Noted. 1934.

Year Ribes Infection 1st Found	County	Ribes Infection Only	Ribes & Pine Infect. with Date of Pine Infection				[illegible] Count[illegible]
			1917	1929	1931	1934	
	Lyon *		X				[illegible]
1929	Linn	X					
	Fayette	X					
	Story				X		[illegible]
1934	Dubuque					X	[illegible]
Totals	5	2	1		1	1	[illegible]

* Infection found on imported white pine and destroyed.

"MEMORANDUM OF UNDERSTANDING BETWEEN THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY FORESTRY SUB-SECTION, IOWA AGRICULTURAL EXPERIMENT STATION, THE EXPERIMENT STATION PLANT PATHOLOGIST, AND THE STATE ENTOMOLOGIST OF IOWA

Cooperative Work in Controlling White Pine Blister Rust in Iowa

"The object of the cooperative work outlined herein is to provide for scouting and inspection for the white pine blister rust in Iowa and for the application of such methods of eradication or control as may be necessary.

"A. The United States Department of Agriculture, Bureau of Plant Industry Agrees:

(1) To pay the salaries and necessary travel expenses of one or more men for such time as may be necessary to determine the occurrence and limits of the spread of this disease in Iowa and under the authority of the Forestry Sub-Section, Iowa Agricultural Experiment Station and the State Entomologist of Iowa, cooperate in the eradication or control of the disease.

(2) To assume responsibility for technical instruction of employees engaged in these investigations and in blister rust eradication and control work.

(3) To conduct such experiments and demonstrations as may be desirable for the purpose of securing effective control of the white pine blister rust in Iowa.

"B. The Forestry Sub-Section, Iowa Agricultural Experiment Station Agrees:

(1) To assume the administrative direction of the aforesaid employees of the United States Bureau of Plant Industry.

(2) To conduct such control activities as may be agreed upon each year by the cooperating parties.

(3) To prepare an annual report of all blister rust control work performed under the provisions of this memorandum, one copy of which will be delivered to each of the cooperating parties.

(4) To submit in prescribed form to the United States Bureau of Plant Industry a monthly report of salaries and expenses paid by the State on Blister Rust control work.

(5) To have all salary and expense vouchers of temporary employees to be paid out of Federal funds approved by the individual directly in charge of supervising cooperative blister rust control work in the State before being submitted to the United States Bureau of Plant Industry for payment. This individual shall be under

appointment as collaborator without compensation in the United States Department of Agriculture. All Federal funds expended in connection with this cooperative work shall be disbursed in accordance with the fiscal regulations of the United States Department of Agriculture.

"C. The State Entomologist of Iowa Agrees:

(1) To cooperate in such survey and control activities in the vicinity of commercial nurseries as may be necessary to the control of the disease in Iowa.

(2) To undertake such destruction of white pines or Ribes in Iowa and such enforcement of State laws as may be necessary for the effective prosecution of blister rust eradication and control work.

"D. The Experiment Station Plant Pathologist Agrees:

(1) To serve in an advisory capacity in matters pertaining to the plan of work, identify specimens of the rust, furnish advice on the technical aspects of the disease and assist in the training of men in methods of recognizing different stages of the rust on pines and Ribes.

"E. It is Mutually Agreed:

(1) That the details of this cooperative work shall be planned and executed jointly by the Bureau of Plant Industry through its Division of Blister Rust Control and cooperating State agencies.

(2) That this memorandum of understanding shall take effect July 1, 1935, and continue in effect until June 30, 1936, provided that any one of the parties may terminate the agreement at any time by a written statement to that effect 30 days in advance of the date of termination desired.

(3) That all persons appointed by the United States Bureau of Plant Industry and its cooperators under this memorandum shall be satisfactory to the cooperating parties.

(4) That the results of the cooperative work may be published jointly, or upon mutual agreement, by any one of the cooperating parties, all with due credit given to the cooperating agencies. All manuscripts therefore shall be criticised by the cooperating parties before publication and all form letters, bulletins and any other circulars to be mailed in penalty envelopes shall be submitted in manuscript form for approval by the United States Department of Agriculture before being printed or sent out, in accordance with Postal law.

(7) That any expenditures involved in the work herein assumed by the United States Bureau of Plant Industry are contingent upon appropriations made by Congress for continuance of these activities, but no Federal funds shall be expended in compensation for host plants destroyed in control work;

(8) That for the fiscal year, July 1, 1935 to June 30, 1936, the Forestry Sub-Section, Iowa Agricultural Experiment Station and its cooperators will expend about $1,700.00 in contributed services and the Federal Government in behalf of the United States Bureau of Plant Industry about $10,000 in connection with the work herein provided for, provided, however, that the maximum expended by the Federal Government shall not exceed $15,000.

In witness whereof the parties hereto have severally signed these presents on the respective days and dates hereinafter set forth.

October 4, 1935 — (S) G. B. MacDonald
Forestry Sub-Section, Iowa Agricultural Experiment Station

October 5, 1935 — (S) I. E. Melhus
Experiment Station Plant Pathologist

October 4, 1935 — (S) R. E. Buchanan
Director of the Agricultural Experiment Station

October 4, 1935 — (S) Carl J. Drake
State Entomologist of Iowa

October 10, 1935 — (S) Knowles A. Ryerson
Chief, Bureau of Plant Industry, United States Department of Agriculture

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Amendment No. 1
[illegible]

"AMENDMENT TO MEMORANDUM OF UNDERSTANDING
Effective July 1, 1934
between
THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF ENTOMOLOGY,
FORESTRY SUB-SECTION, IOWA AGRICULTURAL EXPERIMENT STATION, THE
EXPERIMENT STATION PLANT PATHOLOGIST, AND THE STATE ENTOMOLOGIST
OF IOWA.

Cooperative Work in Controlling White Pine Blister Rust in Iowa:

"Whereas,

The said cooperative work in controlling white pine blister rust in Iowa was, in reorganization within the Department of Agriculture, duly transferred to the Bureau of Entomology of said Department;

Now, therefore, in accordance with the foregoing provisions and pursuant to said reorganization, it is mutually agreed that the paragraphs B-9 and B-6 of the Memorandum of Understanding identified above shall be amended as follows:

B-9. That the general provisions of this memorandum of understanding shall continue in effect until June 30, 1935, provided, that any one of the parties may terminate the agreement at any time by a written statement to that effect 30 days in advance of the date of termination desired.

B-6. That for the fiscal year July 1, 1934 to June 30, 1935 the Forestry Sub-section, Iowa Agricultural Experiment Station and its cooperators will expend about $1700.00 in undertaking operations and the Federal Government on behalf of the United States Bureau of Entomology, about $2,700 in connection with the work herein provided for; provided however, that the maximum expenditure by the Federal Government shall not exceed $3,000.

June 7, 1934 (S) G. B. MacDonald
Forestry Sub-section, Iowa Agricultural Experiment Station

June 7, 1934 (S) I. E. Melhus
Experiment Station Plant Pathologist

June 8, 1934 (S) R. E. Buchanan
Director of the Agricultural Experiment Station

June 7, 1934 (S) Carl J. Drake
State Entomologist of Iowa

July 1, 1934 (S) Lee A. Strong
Chief, Bureau of Entomology and Plant Quarantine, U.S.Dept. Agric."

Except for the State Leader, there was no full time personnel on blister rust in Iowa. The State Leader was employed on PWA funds.

Twenty men were employed on Federal CWA funds during the period January 8 to March 31, 1934. Under the direction of the State Leader, the services of these men were used only on pre-eradication and shelterbelt census work.

One blister rust checker, hired on State ERA funds, was employed during the year. His full time was spent on blister rust during the period of May 28 to September 19. During the period from the first of the year to May 28, part of his time was required on projects other than blister rust, although the major portion of this period was spent on shelterbelt census and pre-eradication work. While he was hired as a blister rust checker, his time was charged, of course, to the project to which he was assigned. Mr. Kenneth Burnett was the blister rust checker.

Burnett's laborers, of course, were ERA enrollees. The number of enrollees assigned to blister rust control during the eradication season averaged 41, for a total of 3,769 man days. While on pre-eradication surveys, Burnett employed two or three enrollees.

During the eradication season, May 3 to September 30, three temporary field agents were employed on ERA funds. Each agent had two laborers, also on ERA time, who were chosen from the county in which the work was performed. W. P. Balcom, Harold E. Beaty and C. E. Stephenson were the field agents.

The State Leader was assisted by a temporary assistant for a few days during April while the preliminary nursery sanitation work was done. Another temporary assistant was employed during the month of October on reworking and checking shelterbelt areas. These temporary assistants were employed on ERA funds.

The Indian Service CCC furnished 31 man days of labor and [illegible] man days of field supervision for working the Indian Reservation (Plantation) at Tama, Iowa.

The two nurseries furnished 14 man days of labor for nursery sanitation. The remainder of labor for this sub-project was furnished by ERA.

In Table 65 there is graphically shown the organization used in Iowa during 1934.

White Pine in Iowa

Native white pine stands in Iowa are confined to the northeastern quarter of the State where they occur as small isolated stands, occupying perhaps 4000 acres. The Pine Hollow area, in northwestern Dubuque County, is the largest single white pine stand in the State.

White pine is used quite extensively in the State as a cultivated tree, particularly in the northern half of the State. In general, planta-

Table 98. - Approximate Number of Men Working on the Several Programs by Months, Blister Beetle Control, Iowa, 1934.

Program	Position	No. Men Employed by Months, 1934												Approx. Man Months
		Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	
[illegible]	State Leader	1	1	1	1	1	1	1	1	1	1	1	1	12
	Agents				1	3	3	3	3	2	1			[illegible]
	Laborers					6	6	6	4	[illegible]				[illegible]
	Sub-total	1	1	1	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]	2	1	1	[illegible]
[illegible]	[illegible]	1		1		[illegible]	[illegible]	[illegible]	[illegible]					[illegible]
	[illegible]					[illegible]	[illegible]	[illegible]	[illegible]	41				[illegible]
	Sub-total	1		1		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]
[illegible]	Foremen						1							[illegible]
	[illegible] Laborers						6							[illegible]
	Sub-total						[illegible]							[illegible]
CWA	Foremen	10	10	10										[illegible]
	Laborers	10	[illegible]	[illegible]										[illegible]
	Sub-total	20	20	[illegible]										[illegible]
	State Leader	1	1	1	1	1	1	1	1	1	1	1	1	12
	Agents				1	3	3	3	3	[illegible]	1			[illegible]
	Foremen	11	10	11		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]
	Laborers	10	10	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]
	Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

white pine makes excellent growth in the State, and has comparatively [illegible] mortality.

As a basis for shelterbelt protection in Iowa, a sufficient shelterbelt is defined as one having eight or more white pine trees.

Using pre-eradication survey data available, it is estimated that there are in the State -

50,000 to 60,000 coniferous shelterbelts
7,000 to 9,000 white pine shelterbelts or
2,000 to 2,500 acres of planted white pine or
1,200 to 1,500 acres of native white pine.

It is difficult to estimate the value of the white pine shelterbelts in the State. Farmers, on numerous occasions, have stated that they would not sell their shelterbelts for several hundred dollars. A well developed shelterbelt affords considerable protection to the farmers' stock and buildings, in addition to enhancing the value of the farmstead from a purely aesthetic standpoint.

Pre-eradication Surveys, Iowa, 1934

The greater portion of the pre-eradication survey work in Iowa during 1934 was performed under Federal Civil Works Administration funds. The other agency supplying funds for this work was the State ECW.

The CWA survey work was organized in December, 1933, and was carried through basically unchanged to March 1, 1934. The original set-up was under the project title "Shelterbelt Census and White Pine Location and Pre-eradication Survey". Ten foremen and ten laborers were employed, making ten crews of two men each. Each crew was assigned to a county in the northern portion of the State. The counties were systematically covered, and the records made on township maps and suitable record forms.

The foremen received $1.20 per hour, 30 hours per week, until February 15, 1934. After that date, the rate was reduced to 60 cents per hour. Transportation was provided by the foremen at his own expense. The laborers were paid at the rate of 50 cents per hour for the entire period. No compensation for expenses, etc. was paid by the CWA. [illegible] rates given were the only expenditures incurred by the CWA.

Pre-eradication surveys by ECW were handled in the same manner as the CWA surveys, except that transportation and field supervision were furnished by the ECW, and CCC enrollees provided the labor.

All surveys were conducted in the northern portion of the State.

General state supervision was by the blister rust state leader under E&PQ funds.

Table 99 gives a summary of all pre-eradication work, classified according to agencies cooperating.

Table 99. - Summary of Pre-eradication Surveys, Iowa, 1934.

	Federal CWA	State CWA	Total
Man-Days Employed-			
Supervision	281	16	[illegible]
Labor	[illegible]	71	286
Total Costs	$3,[illegible]	$606.00	$[illegible]
Townships Covered	300	16	[illegible]
Coniferous shelterbelts visited	[illegible]	[illegible]	14,[illegible]
White Pine shelterbelts visited	1,651	795	2,446
Acres of White Pine mapped	581	357	938
Acres of work-			
Crew	[illegible]	1,620	[illegible]
Scout	110,900	54,150	[illegible]
Total	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
Estimated man days required for eradication of Ribes	890	504	1,394

Local Control

Protection of shelterbelt areas in Iowa during 1934 was performed solely on ERA funds, although CWA and ECW funds were used on shelterbelt pre-eradication surveys.

It will be noted from Table 100 that 86.5% cooperation was secured from private owners of shelterbelts for whom work was attempted. The majority of non-cooperators were of the opinion that blister rust control is not a worthwhile project. Another large group was found to be opposed to any constructive program by the Government. The remainder of dissenters valued their Ribes above their white pine, and were willing to "take a chance" on losing their pines.

In Tables 101, 102 and 103 the unit used in computing averages is the "job" or shelterbelt area, rather than "Acres White Pine" or "Acres Worked". It is believed that the "Per Job" unit is the logical basis for determining the cost of blister rust control on shelterbelts in Iowa.

From Table 100 note that on the total 770 areas worked, there was an average of 293 wild and 14 cultivated Ribes per area. Exactly 0.40 percent man day of labor was employed in the protection of each area. It is significant that the lowest costs per job were incurred in the counties (Franklin and Cerro Gordo) having the greatest percentages of jobs not satisfactorily protected. In other words, it is evident that in the above named counties the quality of work was sacrificed in favor of quantity.

The field organization used in ERA shelterbelt local control work in Iowa for 1934 consisted of three crews, each crew consisting of one agent in charge on a salary basis of $115.00 per month, travel and subsistence expenses allowed (per diem at $2.00) and two laborers hired locally at 50 cents per hour, maximum 30 hours per week. The remainder of the agents' time (total 40 to 55 hours per week) was spent in advance interviews with owners, scheduling of "spill" jobs, and scouting towns for *Ribes nigrum*.

The major portion of the month of October, 1934, was spent in checking and reworking certain shelterbelt areas initially worked during the summer field season. This work was performed by the State Leader and one assistant, and is summarized in the following table. As an aid in determining whether or not a job (shelterbelt area) was satisfactorily protected, the following standards were established:

1) FLS maximum allowable per acre worked (a zone [illegible] including the pines and woodlot -- usually from 1½ to 2 acres).

2) FLS maximum allowable total for all outlying zones, including fence rows, etc.

3) FLS maximum allowable per each [illegible] (In other words, one bush with 21 FLS would throw the entire job into the "not satisfactory" class.)

Table 100. - Local Control, Shelterbelts, Iowa, 1934

County	Jobs Worked	Acres W. P. Total	Acres W. P. Per Job	Acres Worked Open Total	Open Per Job	Scout Total	Scout Per Job	Total Total	Total Per Job	Ribes Pulled Wild Total	Wild Per Job	Cult. Total	Cult. Per Job	[illegible] Total	[illegible]
Franklin	152	[illegible]	.24	414	2.7	11,461	96	11,875	78	19,386	128	484	3	58	[illegible]
Cerro Gordo	162	3[illegible].7	.20	389	2.4	11,841	73	12,230	75	[illegible]	[illegible]	486	3	98	[illegible]
Worth	84	47.0	[illegible]	281	3.2	5,884	70	6,165	74	[illegible]	[illegible]	363	4	58	[illegible]
Winnebago	[illegible]	15.7	.29	146	2.7	[illegible]	70	3,872	73	[illegible]	165	[illegible]	4	[illegible]	[illegible]
Black Hawk	204	54.1	.26	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	90	[illegible]	[illegible]	[illegible]*	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Floyd	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]**	[illegible]	[illegible]

It is estimated that fully 90% of the wild Ribes were found on the areas worked by crews.

* Approximately [illegible]% Ribes [illegible] [illegible].

** Approximately [illegible] of these were Ribes nigrum [illegible].

[illegible]

Table 101. - Labor and Cost Statistics by Counties, Iowa, 1934.

County	Jobs	Man Hours Labor: Total	Man Hours Labor: Per Job	Owner Labor	NRA Labor	Field Costs: Supervision: Salaries	Field Costs: Supervision: Per Diem	Transportation	Total	Per Job
Franklin	158	463	3.06	$28.00	206.50	200.25	104.81	90.24	534.90	[illegible]
Cerro Gordo	163	588	3.62	36.00	258.00	297.86	158.26	112.98	863.04	[illegible]
Worth	84	490	5.83	24.00	281.00	258.77	119.93	76.36	660.05	[illegible]
Winnebago	53	221	4.17	9.00	101.50	127.64	61.94	40.30	340.38	[illegible]
Sioux Hawk	204	1,181	5.79	61.50	528.75	478.80	234.30	132.37	1,436.57	7.07
Mitchell	80	565	6.56	36.50	240.00	181.40	108.81	58.45	609.16	[illegible]
Floyd	40	347	8.37	27.00	146.50	157.57	69.00	43.00	443.17	[illegible]
						Field Equipment Total			9.00	
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

NOTE: All costs except "Owner Labor" were borne by NRA

Table 102. - Classification of [illegible] Jobs Worked As to Ribes Conditions, Iowa, 1934.

County	Both Wild&Cult. Jobs	Both Wild&Cult. %	Wild Only Jobs	Wild Only %	Cult. Only Jobs	Cult. Only %	Ribes Free Jobs	Ribes Free %	Total Jobs	Total %
Franklin	59	36.9	68	42.5	7	4.4	26	16.2	160	100
Cerro Gordo	59	34.1	59	34.1	8	4.7	60	35.1	182	100
Worth	32	38.2	43	51.2	3	3.5	6	7.1	84	100
Winnebago	19	33.9	14	25.0	10	17.9	13	23.2	56	100
Black Hawk	76	37.4	56	27.6	33	16.1	38	18.7	204	100
Mitchell	29	36.2	37	46.3	1	1.3	13	16.2	80	100
Floyd	14	35.0	25	62.5	1	2.5	2	5.0	40	100
Totals	279	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	100

This classification is based simply on the presence or absence of wild or cultivated Ribes on the various [illegible] jobs, without regard to the abundance of Ribes.

Table 105. - Status of Shelterbelt Jobs Listed for Protection.

County	Jobs Worked	No. Coop.	% Coop.*	Not ** Worth W'k'g	Total Jobs Listed
Franklin	158	29	84%	18	194
Cerro Gordo	162	36	90%	18	220
Worth	84	14	85%	12	110
Winnebago	35	3	91%	0	38
Black Hawk	274	35	90%	27	334
Mitchell	80	14	85%	5	99 ***
Floyd	40	8	83%	1	49 ***
Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* Percent of cooperation figured on the basis of "Jobs Worked" plus "No Cooperation" equals 100%.

** "Jobs Not Worth Working" includes those jobs with too few trees, high mortality, abandoned, or taken in non-cooperating survey.

*** Counties incomplete.

Table 104. - [illegible] Check, [illegible], Iowa, 1934

County	New Areas Checked	Jobs OK	Jobs Not OK	Percent OK	Percent Not OK
Cerro Gordo	73	54	19	73.9	26.1
Franklin	63	42	21	66.7	33.3
Worth	28	24	4	85.7	14.3
Winnebago	18	[illegible]	3	[illegible]	[illegible]
Black Hawk	68	59	9	86.8	13.2
Totals	250	194	56	77.6	22.4

All jobs not meeting the "[illegible]" specifications were reworked in October, 1934. A total of 250 jobs were reworked or corrected by the check. The average cost of each of these jobs was $1.06.

State ECW Local Control

Local control on the Pine Hollow Area in Northeastern Dubuque County, Iowa, was performed by the State ECW under the field supervision of Kenneth Burnett, blister rust checker. Following is a summary of the work and costs.

Work

Total acres cleared of Ribes - - - - - - - - - - - - - - - - - 1,088
Ribes eradicated (all wild) - - - - - - - - - - - - - - - - [illegible]
Man days labor - [illegible]
Man days supervision - [illegible]
Acres of white pine protected (including approximately 300 acres of Planting Site) - - - 211

Costs

Labor (ECW at $3.00 per day) - - - - - - - - - - - - - - [illegible]
Supervision, field - [illegible]
Transportation (labor) - - - - - - - - - - - - - - - - - - [illegible]
Transportation (supervision) - - - - - - - - - - - - - - - [illegible]
Station, etc. - [illegible]
Total costs - [illegible]

Cost per acre pine protected - - - - - - - - - - - - - - - [illegible]

Cost per acre worked - - - - - - - - - - - - - - - - - - - [illegible]

The costs of local control on this area were excessive and can be justified only by the fact that the area contains some of the best white pine in the state, and that it has excellent possibilities as a future State Park. Furthermore, it seemed that the availability of ECW labor

and ECW supervision offered the best opportunity in sight for the initial eradication on the area.

Several important difficult factors should be mentioned. To quote from Mr. Burnett's final report on the job:

"The project was started on May 28, 1934, and closed on September 19, 1934. During this time the following were some of the difficulties encountered:

1. The terrain was rough and covered with brush. There were also a great many cliffs to be worked (a crew of from five to eight laborers and a foreman were employed almost constantly on cliff work).

2. The constant change in the personnel of the ECW made necessary to make about three complete changes in the eradication crews.

3. Rattlesnakes also detracted the attention of the men from the work. Twenty-one rattlers were caught and killed during the time that the crew worked in the area."

The Pine Hollow Area is located approximately 30 miles from the site of the CCC Camp at Cascade, Iowa. No small amount of time was lost in travel to and from the work project.

The following table summarizes the checking of the various "Jobs" on the area. For ease in handling reports, etc. the area was divided into units called "Jobs". In the checking summary below names other than "Burnett" or "Lubberts" are those of CCC crew foremen.

Table 105 - Checking, ECW Blister Rust Control, Iowa, 1934

Job No.	Checked By	Acres in Check	Feet of Live Stem After First Eradication	Feet of Live Stem After Second Eradication	Final
1	Burnett	60	33.0	7.3	7.3
2	Burnett, Lubberts	44	12.5	-	12.5
3	Lubberts	5	6.7	-	6.7
4	Burnett	1	28.0	9.0	9.0
5	Burnett, Lubberts	2	6.7	-	6.7
6	Lubberts	3	7.4	-	7.4
7	Burnett	4	4.2	-	4.2
8	Burnett	6	1.1	-	1.1
9	Burnett	3	1.3	-	1.3
10	Covington	1	0.7	-	0.7
11	Burnett	1	13.2	-	13.2
12	Burnett	1	36.1	5.2	5.2
13	Burnett, Jaire	10	5.8	-	5.8
14	Burnett, Lubberts	2	6.1	-	6.1
15	Burnett, Jaire	1	1.7	-	1.7
16	Burnett, Covington	3	4.3	-	4.3
17	Burnett	1	5.1	-	5.1
Total		148		WEIGHTED AVERAGE	[illegible]

Indian Service CCC Local Control

Local control on the Sac-Fox Indian Reservation, commonly known as the Tama Indian Reservation, Tama, Iowa, was performed by the Indian Service ECW, using Indian CCC labor and with Mr. [illegible], Foreman for the Reservation, as field leader in charge.

Following is a summary of the work and costs:

Work

Total acreage cleared of Ribes	960
Ribes eradicated	7,180
Man days labor	51
Man days supervision	7
Acres of white pine protected	10

Costs

Labor ($2.10 per day)	$106.80
Supervision, IS-ECW	34.00
Other costs	2.50
Total costs	143.30
Cost per acre worked	0.15
Cost per acre of white pine	14.33

A formal check has not yet been made on this job, but will be made in the spring of 1935.

In Table 106 local control for 1933 and 1934 is summarized. To date $19,656.07 has been spent supplying initial protection to [illegible] pine stands and plantations by removing [illegible] Ribes from 50,000 acres of land.

Nursery Sanitation

Two private nurseries in the state of Iowa applied for [illegible] white pine shipping permits for the year 1934: viz., Earl Ferris Nursery Company, Hampton, Iowa, and Mount Arbor Nurseries, Shenandoah, Iowa.

During the month of April the state leader with the assistance of a temporary employee made the preliminary surveys of these nurseries, getting the permission of the [illegible] and existing maps of the areas [illegible].

The first 1934 eradication work at the Mt. Arbor Nursery was performed during the latter part of the month of May.

The first 1934 eradication work at the Earl Ferris Nursery was performed early in June.

Table 105. - Summary by Years of Ribes Eradication Work, Iowa, 1933-1934.

Year	Acres Worked			Shelter-belt	Ribes		Per Acre		Cost per
	Initial	Second	Total	Jobs	Pulled	Cost	Cost	Ribes	bush, cents
1933	1,608	-	1,608		21,882	$1,415.00	.88	13.6	6.5
1934	63,432	-	63,432	776	520,911	15,267.07	.24	83.8	[illegible]
Total	[illegible]		[illegible]	776	[illegible]	$16,682.07	.26	[illegible]	[illegible]

On June 6 and 7, the sanitation work at the Ferris Nursery was checked by Messrs. Putnam, Corlise and Lubberts. A considerable number of small Ribes was found and removed on this check. June 7 and 8 were spent checking the Mt. Arbor Nursery sanitation work by Mr. Trecker and Messrs. Corlise and Lubberts. A very few sprouts of wild Ribes, and a small plot of Ribes alpinum within the white pine growing block were found on this check.

During September a recheck was made of the heavy Ribes areas adjacent to the Earl Ferris Nursery and the plot of R. alpinum in the Mt. Arbor Nursery was destroyed.

The Ribes areas both of the nurseries will be thoroughly reworked in the spring of 1936.

Table 107 summarizes nursery sanitation work in Iowa for 1935.

Table 108 gives a summary of nursery sanitation over the two years 1935 and 1934.

Informational Activities

Informational activities in Iowa for 1935 were carried on in conjunction with the regular work without setting up the activities as a separate sub-project.

Most effective and useful of the informational activities was the [illegible] of the press. During the pre-eradication work season (largely [illegible]) a number of news items were published in local newspapers. These items briefly described the work of the camps, the purposes, and the method of control of blister rust. In one case, the publisher wrote up an article after an interview with one of the CCC men, in such a manner as to discourage the planting of white pine. This type of publicity is, of course, to be avoided if possible.

It is estimated that from seven to ten thousand landowners were directly contacted during the execution of the various sub-projects.

A considerable number of Miscellaneous Publication No. 22 (revised) by Dr. Martin was distributed to owners of woodlands and other interested persons.

On July 2 the State Leader made a trip to Minnesota and spent July 3 and 4 in the field with State Leader Fisher of Minnesota. Infected areas in the vicinity of Taylors Falls and [illegible] were observed.

Costs

Table 109 shows the State and Federal expenditures for all Blister Rust Control projects during 1935. These expenditures are divided according to the agency participating and the phase of control work in which they were involved.

Table [illegible] - [illegible]

Name & Location	Acres in Tile Block	Work-ing	Tons	Horse Normal	[illegible] Wild	Culti-vated	Stock [illegible]
Earl Ferris, Hampton,	90	2nd	1904	[illegible]	1,457	8	5
[illegible], Shenandoah Iowa	40	2nd	1904	350	150	150	[illegible]
Totals [illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Name & Location	[illegible]	Tile Amount	Tile Agency	[illegible]	[illegible]	[illegible]	Total
Earl Ferris, Hampton,	[illegible]	104.00 (70.00)	Owner [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible], Shenandoah Iowa	[illegible]	[illegible] (25.50)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Totals [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table [illegible] - [illegible] 1952-1958

Name & Location	Acres in Pine Block	Working	Year	Acres Worked	Kill	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Stump Competition	[illegible]	[illegible]	[illegible]
[illegible]	80	1st	1955	[illegible]	190	85	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible], Iowa		2nd	1957	600	3,000	80	90	90	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		3rd	1958	350	4,007	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] Grove, Iowa	90	1st	1953	40	3,570	100	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			1954	(No work performed)											
[illegible], Iowa	40	1st	1952	670	1,037	100	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		2nd	1956	180	131	100	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* Job incomplete.

Table 109. - State and Federal Expenditures for all Blister Rust Control Projects, Iowa During Calendar Year, 1934.

Agency	Expend-iture classi-fication	Super-vision	Ribes eradi-cation	Currant eradica-tion	Pre-eradi-cation survey	Equip-ment and misc.	Total
State	Salaries	900.00	212.00	28.00			1,140.00
	Expenses	800.00		15.00			815.00
	Total	[illegible]	212.00	[illegible]			[illegible]
F.E.R.A.	Salaries	1,847.50	3,384.64	316.90			[illegible]
	Expenses	369.19	1,476.53	137.10		467.11	[illegible]
	Total	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
State E.C.W.	Salaries		9,552.85		501.00		10,053.85
	Expenses		497.05		105.00		602.05
	Total		[illegible]		[illegible]		[illegible]
Ind.Ser. E.C.W.	Salaries		140.50				140.50
	Expenses		3.30				3.30
	Total		[illegible]				[illegible]
C.W.A.	Salaries				3,309.70		3,309.70
	Expenses				-		-
	Total				[illegible]		[illegible]
Total	Salaries	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]
	Expenses	[illegible]	[illegible]	154.10	[illegible]	467.11	[illegible]
	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 110 shows percent of expenditures of each agency spent on each activity while Table 111 shows percent of activity costs spent by each agency during 1934.

CWA funds were used only and entirely in pre-eradication surveys of shelterbelt areas.

A limited amount of shelterbelt pre-eradication work was performed under the State ECW. All labor, field supervision and transportation were furnished by the ECW.

The major portion of the cost of nursery sanitation was borne by the ERA program. Labor in the amount of $25.00 and $15.00 worth of credit for Ribes removed was furnished by the two nurseries. The value of time and expenses of Dr. Fracker and Messrs. Putnam and Corliss is not included in the summary of costs of nursery sanitation.

Only ERA funds were used in local control around shelterbelt areas, although $212.00 worth of labor was furnished by the owners. The costs of checking and examining certain shelterbelt areas by the state leader and his assistant are logically chargeable to local control. Therefore, the salary and expenses of the state leader, cost of operation of the Government owned truck during the month, and the wages of the temporary assistants are properly charged under "Local Control, Shelterbelts, ERA".

It is conservatively estimated that the cost of local control on each shelterbelt area $6.45 is not more than 2 percent of the total value of the shelterbelt.

In local control on the Pine Hollow area, performed by State ECW, certain supplies were furnished by ERA. This item ($60.00) consists largely of cotton string used for marking purposes.

In local control, of the Sac-Fox Indian Reservation Plantation, all items hereunder given are self-explanatory.

The cost of State supervision was borne in full by the ERA program. All costs which are not directly chargeable to other specific sub-projects are entered under this item, as are costs of incidental scouting, checking, etc. The purchase price of the Government owned truck is not truly a charge against 1934 costs, but is entered in order that the total expenditures for the year may be shown. The item "Equipment and Miscellaneous" includes the estimated value of office supplies, etc. shipped from Washington and Milwaukee.

The value of State contribution, office clerical, etc., including the stated value of office space, clerical help, administrative direction, use of equipment, supplies, etc. furnished by the State of Iowa through the Iowa State College, is given under State Contribution in Table 109.

Table 110. - Percent of Expenditures of Each Agency Spent on Each Activity, [illegible], 1934.

Agency	Supervision	Ribes eradication	Nursery sanitation	Pre-eradication	Equipment	Total
State	86.9	10.9	2.2			100.0
ERA	27.7	60.8	5.7		5.8	100.0
State ECW		94.3		5.7		100.0
I.S. W.C.W.		100.0				100.0
CWA				100.0		100.0
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 111. - Percent of Activity Costs Spent by Each Agency, Iowa, 1934.

Agency	Super-vision	Ribes Eradi-cation	Nursery sanitation	Pre-Eradication	Equipment	Total
State	43.4	1.3	8.5			8.1
NRA	56.6	31.9	91.5		100.0	33.3
State ECW		65.9		15.5		44.3
ES-ECW		0.9				0.5
CWA				84.5		13.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

Conclusion

Practically all native pine stands in the State have been given initial protection and will not need attention for [illegible] years [illegible].

The most important [illegible] areas are in the northeastern part of the State where it is hoped local control can be [illegible] in 1936.

In addition to the local control program, it is planned to give particular attention early in the spring of 1936 to nursery sanitation and late in the fall to cultivated black currant eradication in the districts where good white pine [illegible] are developed.

BLISTER RUST CONTROL, ILLINOIS, 1954

History of Work

Previous to 1947 blister rust control work in Illinois was largely confined to scouting for the disease and keeping shipments of pines from [illegible] areas to be [illegible].

No blister rust has ever been found on native pine in Illinois State. However, blister rust on [illegible] white pine at the Brook Falls and Emery, Wisconsin, and Taylor's Falls, Minnesota, in 1916 was traced to a large forest tree nursery in Illinois which imported the white pine from J. Heins, Halstenbek, Germany, in [illegible] and 1909.

From 1917 to 1919, inclusive, scouting work was done by Federal agents in cooperation with the State Nursery Inspector's staff. In this work they inspected all nurseries handling white pine and all known private plantings. No rust was found.

Practically no further work was done on blister rust control until 1951 when Messrs. [illegible] and [illegible] made a short scouting trip in the northern part of the State. They found no rust.

In 1952 a Memorandum of Understanding was signed by between the Illinois State Department of Public Works and Buildings, the Illinois State Department of Agriculture and the U. S. Department of Agriculture. Control work was done on [illegible] Lowden's estate and the [illegible] Park near Oregon. In these two years 220 acres of plantings and native pine were protected by the removal of 200,688 Ribes from 1,000 acres at a cost of 86 cents per acre protected. An average of [illegible] wild Ribes averaging 103.7 bushes per acre was worked per man day.

Organization

In 1954 control work was practically limited to the post-eradication surveys conducted by [illegible]. Local control was conducted (second eradication) by [illegible] Lowden [illegible].

An allotment of $10,000 was made from [illegible] funds for control work in the State in 1952, but the actual control was [illegible] in 1948 with Agent [illegible] in charge. The original Memorandum of Understanding together with Amendment [illegible] are as follows.

"MEMORANDUM OF UNDERSTANDING BETWEEN THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY, THE ILLINOIS STATE DEPARTMENT OF PUBLIC WORKS AND BUILDINGS, AND THE ILLINOIS STATE DEPARTMENT OF AGRICULTURE.

Cooperative Work in Controlling White Pine Blister Rust in Illinois.

"The object of the cooperative work outlined herein is to provide for scouting and inspection for the white pine blister rust in Illinois and for the application of such methods of eradication or control as may be necessary.

"A. <u>The United States Department of Agriculture, Bureau of Plant Industry Agrees:</u>

(1) To pay the salaries and necessary travel expenses of one or more men for such time as may be necessary to determine the occurrence and limits of the spread of this disease in Illinois, and under the authority of the Illinois State Department of Public Works and Buildings and its cooperators shall cooperate in the eradication or control of the disease wherever found.

(2) To assume responsibility for technical instruction of employees engaged in these investigations.

(3) To conduct such experiments and demonstrations as may be desirable for the purpose of securing effective control of the white pine blister rust in Illinois.

"B. <u>The Illinois State Department of Public Works And Buildings Agrees:</u>

(1) To assume the administrative direction of the aforesaid employees of the United States Bureau of Plant Industry.

(2) To conduct such control activities as may be agreed upon each year by the cooperating parties.

(3) To prepare an annual report of all blister rust control work performed under the provisions of this memorandum, one copy of which will be delivered to each of the cooperating parties.

(4) To submit in prescribed form to the United States Bureau of Plant Industry a monthly report of salaries and expenses paid by the State on blister rust control work.

(5) To have all salary and expense vouchers of temporary employees to be paid out of Federal funds approved by the individual directly in charge of cooperative blister rust control work in the State before being submitted to the [illegible]

Bureau of Plant Industry for payment. This individual shall be under appointment as collaborator without compensation [illegible] the United States Department of Agriculture. All Federal funds expended in connection with this cooperative work shall be disbursed in accordance with the fiscal regulations of the United States Department of Agriculture.

"C. The Illinois State Department of Agriculture Agrees:

(1) To conduct such survey and control activities as may be agreed upon each year by the cooperating parties.

(2) To undertake such destruction of white pines or Ribes in Illinois and such enforcement of State laws as may be necessary for the effective prosecution of blister rust control work.

(3) To deputize and authorize the aforesaid employees of the United States Bureau of Plant Industry to destroy such pines, currants and gooseberries as may be necessary and as provided for by State laws.

"D. It is Mutually Agreed:

(1) That the details of this cooperative work shall be planned and executed jointly by the Bureau of Plant Industry through its Division of Blister Rust Control, the Illinois State Department of Public Works and Buildings and the Illinois State Department of Agriculture.

(2) That this memorandum of understanding shall take effect July 1, 1932, and continue in effect until June 30, 193[illegible], provided, that any one of the parties may terminate the agreement at any time by a written statement to that effect 30 days in advance of the date of termination desired.

(3) That all persons appointed by the United States Bureau of Plant Industry and its cooperators under this memorandum shall be satisfactory to the cooperating parties.

(4) That the results of the cooperative work may be published [illegible] as upon mutual agreement, by either cooperating party, with due credit given to the cooperating agencies. All manuscripts [illegible] for, shall be criticised by the cooperating parties before publication and, <u>all form letters, bulletins and any other circulars to be mailed in penalty envelopes shall be submitted in [illegible] form for approval of the United States Department of Agriculture before being printed or sent out, in accordance with Postal [illegible]</u>

(5) That any expenditures involved in the work herein assumed by the United States Bureau of Plant Industry are contingent upon appropriations made by Congress for continuance of these activities.

but no Federal funds shall be expended in compensation for host plants destroyed in control work.

(6) That for the fiscal year July 1, 1932 to June 30, 1933, the Illinois State Department of Public Works and Buildings and its cooperators will expend about five hundred dollars and the Federal Government in behalf of the United States Bureau of Plant Industry about five hundred dollars in connection with the work herein provided for, provided, however, that the maximum expenditure of the Federal Government shall not exceed $1,000.

In witness whereof the parties hereto have severally signed these presents on the respective days and dates hereinafter set forth.

Aug. 26, 1932 (S) E. H. Cleaveland
Director, Illinois State Department of Public Works and Buildings.

Aug. 27, 1932 (S) Stuart Pierson
Director, Illinois State Department of Agriculture

Sept. 19, 1932 (S) W. A. Taylor
Chief, Bureau of Plant Industry, U.S. Dept. of Agriculture.

Approved:

Sept. 1932 (S) A. F. Woods
Director of Scientific Work.

Amendment No. [illegible]
Washington, [illegible]

"AMENDMENT TO MEMORANDUM OF UNDERSTANDING
Effective July 1, 1933
between
THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF ENTOMOLOGY, THE ILLINOIS STATE DEPARTMENT OF CONSERVATION, THE ILLINOIS STATE DEPART-MENT OF PUBLIC WORKS AND BUILDINGS, AND THE ILLINOIS STATE DEPARTMENT OF AGRICULTURE.

Cooperative Work in Controlling White Pine Blister Rust in Illinois

"Whereas,

The said cooperative work in controlling white pine blister rust in Illinois has, by reorganization within the Department of Agriculture, been transferred to the Bureau of Entomology of said Department.

Now, therefore, in accordance with the foregoing provision and pursuant to such reorganization, it is mutually agreed that the paragraphs D-2 and D-6 of the Memorandum of Understanding described above shall be amended as follows:

D-5. That the several undertakings of this memorandum shall continue in effect until June 30, 1935, provided that any one of the parties may terminate the agreement by a written statement to that effect 30 days in advance of the termination date desired.

D-6 That for the fiscal year July 1, 1934 to June 30, 1935, the Illinois State Department of Public Works and Buildings, and the Illinois State Department of Agriculture and its cooperators will expend about $ 895.00 and the Federal Government in behalf of the United States Bureau of Entomology about $3,000, in connection with the work herein provided for, provided, however, that the maximum expended by the Federal Government shall not exceed $4,000.

May 31, 1934 (S) D. F. Thompson
Director, Illinois State Department of Conservation.

May 31, 1934 (S) Robert Kingery
Director, Illinois State Dept. of Public Works & Buildings.

May 31, 1934 (S) Walter W. McLaughlin
Director, Illinois State Department of Agriculture.

July 1, 1934 (S) Lee A. Strong
Chief, Bureau of Entomology and Plant Quarantine, U. S. Dept. of Agriculture."

Spread of the Rust

The white pine blister rust has not been found in the state in spite of the nearness of infections found in Wisconsin and the [illegible] in the state.

White Pine in the State

Only a few stands of native pine exist in the State. The small ones are found in Starved Rock and The Pines State Parks. In addition there are several important plantations, especially [illegible] at Rockford in Winnebago County.

Local Control

Early in the spring of 1934 an agent was appointed on ECW funds. He started current ribes eradication around the [illegible] and city parks of Rockford using CWA labor. These [illegible]

Table 112. - Approximate Number of Men Working on the Several Programs by Months, Blister Rust Control, Illinois, 1934.

Program	Position	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Man-months
CWA	Temp. State Leader			1	1	[illegible]	[illegible]	1	1	1	1			[illegible]
ECW Parks	Foreman				1	1	1	1	1					
	CCC Laborers				14	14	6	24	20	5				[illegible]
	Sub-total				15	15	[illegible]	25	[illegible]	5				[illegible]
CWA	Laborers			6										[illegible]
FERA	Laborers					7	[illegible]			4				[illegible]
All	Temp. State Leader			-	1	1	1	1	1	1	1			[illegible]
Programs	Foremen				1	[illegible]	1	1	1					[illegible]
	Laborers			6	14	21	11	24	20	13				[illegible]
	Grand Total			[illegible]	[illegible]	[illegible]	13	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]

eradication of large R. missouriense. Later, when the bushes were in the leaf-up stage crews were sent through these same areas to pick up the smaller bushes and missed large ones. Table 113 shows the approximate number of men working on the various programs by months in Illinois during 1934.

Later in the season the agent transferred to the other pine areas of the state and early in the fall had completed the task of giving initial protection to all known important pine areas of the state with the exception of the pine plantation at Dixon, Illinois, where the City Park Board did not cooperate. It is their feeling that Ribes count are important in [illegible] funds.

The following types of labor were used at the various locations indicated.

The City of Rockford allocated CWA and FERA labor in the amount of 101 man days for eradicating Ribes bushes from the City Parks where white pine is grown and a 900 foot protection zone around each.

Winnebago County allocated CWA and FERA labor in the total amount of 415 man days to eradicate Ribes from the pine growing County Parks and to give initial protection to their nurseries and pine plantations.

Mr. Lowden spent 28 man days of labor in checking over his estate. This was the third time part of his estate has been worked for Ribes and it is not likely that many Ribes will be found for several years to come. This eradication work, initially supervised by [illegible] in 1933, has been very thorough.

Department of Interior CCC camps performed the eradication work done in Cook and LaSalle Counties, also the second eradication work performed at White Pine State Park in Ogle County. To perform this work [illegible] man days of labor was used. This labor was evaluated at $[illegible] per man day in arriving at costs as shown in Tables 113 and 115.

Table 113 shows the results of the work performed in the state in 1934. The individual projects are listed showing the programs under which the work (labor) was performed together with the acres worked, Ribes bushes pulled and pine acreage protected.

Table 114 summarizes all work performed in Illinois since control work was started in 1932.

Table 114. - Summary by Years, Local Control, Illinois, 1932-1934 Inclusive

Year	Acres Worked: Initial	Acres Worked: Reworked	Acres Worked: Total	Ribes Pulled	Total Cost	Per Acre: Cost	Per Acre: Ribes	[illegible]
1932	1,960		1,960	239,600	$1,051.84	0.54	153	[illegible]
1933		1,350	1,350	7,800	91.25	.07	[illegible]	[illegible]
1934	2,567	2,031	4,598	399,414	[illegible]	.62	[illegible]	[illegible]
Total	4,527	3,381	7,908	[illegible]	$[illegible]	.50	[illegible]	[illegible]

Table 115. - State and Federal Expenditures for all Blister Rust Control Projects, Illinois During Calendar Year 193[illegible].

Agency	Expenditure classification	Supervision	[illegible] agent activities	Ribes eradication	Field Work: Pre-eradication survey	Field Work: Checking	Field Work: Other field work	Total
State	Salaries	90.00						90.00
	Expenses	-						-
	Total	[illegible]						[illegible]
Private Co-op.	Salaries			87.40				87.40
	Expenses			-				-
	Total			[illegible]				[illegible]
FERA State	Salaries			558.98				558.98
	Expenses			-				-
	Total			[illegible]				[illegible]
FERA Fed.	Salaries			718.98				718.98
	Expenses			-				-
	Total			[illegible]				[illegible]
Parks ECW	Salaries			358.00				358.00
	Expenses			-				-
	Total			[illegible]				[illegible]
PWA	Salaries		996.07	617.99	88.88	48.86	79.40	1,071.21
	Expenses		150.68	258.17	14.29	14.24	10.12	193.68
	Total		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CWA	Salaries			58.00				58.00
	Expenses			-				-
	Total			[illegible]				[illegible]
Total	Salaries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Expenses	-	[illegible]	[illegible]	14.29	14.24	[illegible]	[illegible]
	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 116. - Percent of Expenditures of Each Agency Spent on Each Activity, Illinois, 1934.

Agency	Super-vision	B.R.C. Agent activities	Ribes eradi-cation	Pre-erad-ication Survey	Checking	Other field Data	Total
State	100						100
Private Coop.			100				100
FERA State			100				100
FERA Fed.			100				100
Parks ECW			100				100
PWA		54.9	35.9	1.9	5.4	6.4	100
CWA			100				100
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	100

Table 117. - Percent of Activity Costs Spent by Each Agency, Illinois, 1934.

Agency	Supervision	B.P.Q. agent activities	Blues Eradication	Pre-eradication survey	Checking	Other field data	Total
State	100						2.1
Private Co-op.			2.4				1.5
FERA State			18.6				6.2
FERA Fed.			35.4				16.5
Parks ECW			30.3				12.9
PWA		100	27.5	100	100	100	60.7
CWA			1.8				1.2
Total	100	100	100	100	100	100	100

Costs

In Table 118 the funds supplied by the various agencies entering into the cooperative agreement are broken down according to the various activities involved in the conduction of the work during the season. The cost table includes certain costs that are contributed in services and rental only. They do not necessarily indicate an actual outlay of money but a contribution of personal or official time, office space, etc. to the project.

Table 119 gives the percent of expenditures of each agency spent on each activity while in Table 120 there is given the percent of total costs spent by each agency.

Experimental Work

Experiments were made in 1935 on the Lowden Estate with chemicals in Ribes eradication. These plots (as outlined in the 1935 report) were again examined in 1936 and no indication was evident that the bushes had ever resprouted or that they ever will. The treatment given R. missouriense was evidently very effective.

Conclusion

Although all of the most important white pine stands have been protected, there is one project not completed in the state that should be eradicated of wild Ribes bushes. This project is Lowell Park at Dixon, Illinois. The city could not cooperate in this work due to the fact that Simon, West and Blair, consulting landscape engineers of Chicago, who were in charge of improving the park, insisted on leaving the Ribes so that song birds will have the fruit for food.

Within two or three years, most of the pine areas in the state that have received initial protection should be reworked, so that this protected condition can be maintained. After a second or third working most of the local sources of regeneration on the part of Ribes have been destroyed and it is then comparatively simple to keep the area free of Ribes.

BLISTER RUST CONTROL, INDIANA, 1934

History of Work

"The blister rust was found by Benjamin W. Douglass, Indiana State Entomologist, in 1915 on a shipment of white pine from Europe at the Princeton Nursery at Princeton. The whole lot of pines was destroyed at once. No disease has been since found in the state." (Report on White Pine Blister Rust Survey for Indiana 1917 by Roy G. Pierce).

From 1917 to 1925, inclusive, blister rust control work in Indiana consisted of scouting for the rust during the summers by Federal employees in cooperation with members of the State Nursery Inspection Service. Emphasis was placed on destroying shipments of white pine from infected nurseries. No rust was found.

A rust on *Ribes nigrum* was collected in late October, 1929, by R. A. Sheals in Northeastern Indiana practically on the Indiana-Ohio line. It is possible that this was *Cronartium ribicola*, although it was not possible to positively identify it as such because of the condition of the specimen.

In 1931 Sheals and Pierce made a short scouting trip in Northern Indiana. No infection was found.

In 1933 the only work done in Indiana consisted of a short inspection trip made by Putnam primarily for the purpose of conferring with State officials regarding blister rust control work. No rust was found although several likely places were examined.

Barnes from the Milwaukee Office and State Agent Dobbs spent seven days in the Fall of 1934 scouting the northern tier of counties for rust on Ribes. Particular attention was given to the search for cultivated black currant bushes. No infection was found by either of these men.

Organization

In 1933 a Memorandum of Understanding was signed by the Indiana State Officials and Officials of the Bureau of Plant Industry. This memorandum follows.

"MEMORANDUM OF UNDERSTANDING BETWEEN THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY, THE STATE FORESTER OF INDIANA, AND THE STATE ENTOMOLOGIST OF INDIANA

Cooperative Work in Controlling White Pine Blister Rust in Indiana.

"The object of the cooperative work outlined herein is to provide for scouting and inspection for the white pine blister rust in Indiana and for the application of such methods of eradication or control as may be necessary

"A. The United States Department of Agriculture, Bureau of Plant Industry, Agrees:

(1) To pay the salaries and necessary travel expenses of [illegible] men for such time as may be necessary to determine the occurrence and limits of the spread of this disease in Indiana, and, under the authority of the Indiana State Forester and/or State Entomologist of Indiana, cooperate in the eradication or control of the disease wherever found.

(2) To assume responsibility for technical instruction of employees engaged in these investigations and in blister rust control work.

(3) To conduct such experiments and demonstrations as may be desirable for the purpose of securing effective control of the white pine blister rust in Indiana.

"B. The State Forester of Indiana Agrees:

(1) To assume the administrative direction of the aforesaid employees of the United States Bureau of Plant Industry.

(2) To conduct such control activities as may be agreed upon each year by the cooperative parties.

(3) To prepare an annual report of all blister rust control work performed under the provisions of this memorandum, one copy of which will be delivered to each of the cooperating parties.

(4) To submit in [illegible] form to the United States Bureau of Plant Industry a monthly report of salaries and expenses paid by the State on blister rust control work.

(5) To have all salary and expense vouchers of temporary employees to be paid out of Federal funds approved by the individual directly in charge of supervising cooperative blister rust control work in the State before being submitted to the United States Bureau of Plant Industry for payment. This individual shall be under appointment as collaborator without compensation in the United States Department of Agriculture. All Federal funds expended in connection with this cooperative work shall be disbursed in accordance with the fiscal regulations of the United States Department of Agriculture.

"C. The State Entomologist of Indiana Agrees:

(1) To cooperate in such survey and control activities as may be necessary to the control of the disease in Indiana.

(2) To undertake such destruction of white pines or Ribes in Indiana and such enforcement of State laws as may be necessary for the effective prosecution of blister rust control work.

"It is Mutually Agreed:

(1) That the details of this cooperative work shall be planned and executed by the Bureau of Plant Industry through its Division of Blister Rust Control, the State Forester of Indiana and the State Entomologist of Indiana.

(2) That this memorandum of understanding shall take effect July 1, 1933, and continue in effect until June 30, 1936, provided that any one of the parties may terminate the agreement at any time by a written statement to that effect 30 days in advance of the date of termination desired.

(3) That all personnel appointed by the United States Bureau of Plant Industry and its cooperators under this memorandum shall be satisfactory to the cooperating parties.

(4) That the results of the cooperative work may be published jointly or upon mutual agreement, by any one of the cooperating parties with due credit given to the cooperating agencies. All manuscripts therefor, shall be criticized by the cooperating parties before publication and, all form letters, bulletins and any other circulars to be mailed in penalty envelopes shall be submitted in manuscript form for approval by the United States Department of Agriculture before being printed or sent out, in accordance with Postal Law.

(5) That any expenditure involved in the work herein planned for the United States Bureau of Plant Industry are contingent upon appropriations made by Congress for continuance of these activities, but no Federal funds shall be expended in compensation for host plants destroyed in control work.

(6) That for the fiscal year July 1, 1933, to June 30, 1934, the State Forester of Indiana and the cooperators will expend about $500.00 in contributed services and the Federal Government in behalf of the United States Bureau of Plant Industry about $2,000 in connection with the work herein provided for, provided, however, that the maximum expended by the Federal Government shall not exceed $2,500.

"In witness whereof the parties hereto have severally signed these presents on the respective days and dates hereinafter set forth.

(S) Ralph F. Wilcox
State Forester of Indiana

(S) Frank N. Wallace
State Entomologist of Indiana

(S) K. F. Kellerman
Acting Chief, Bureau of Plant Industry
U. S. Department of Agriculture

June 26, 1934

-oOo-

"AMENDMENT TO MEMORANDUM OF UNDERSTANDING   Amendment No. 1
Effective July 1, 1936   Washington, D.C.
between
THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF ENTOMOLOGY,
THE STATE FORESTER OF INDIANA, AND THE STATE ENTOMOLOGIST OF
INDIANA.

Cooperative Work in controlling White Pine Blister Rust in Indiana

"Whereas,

The said cooperative work in controlling white pine blister rust in Indiana has, by reorganization within the Department of Agriculture, been transferred to the Bureau of Entomology of said Department.

Now, therefore in accordance with the foregoing provision and pursuant to such reorganization it is mutually agreed that paragraphs D-2 and D-6 of the Memorandum of Understanding described above shall be amended as follows:

D-2 That this memorandum of understanding shall continue in effect until June 30, 1936, provided, that any one of the parties may terminate the agreement at any time by a written statement to that effect 30 days in advance of the date of termination desired.

D-6 That for the fiscal year July 1, 1936, to June 30, 1937, the State Forester of Indiana and his cooperators will spend about $4,000.00 and the Federal Government in behalf of the United States Bureau of Entomology, about $3,000 in connection with the work herein provided for; provided, however, that the entire expenditure by the Federal Government shall not exceed $3,000.

__________ (S) Ralph F. Wilcox
State Forester of Indiana.

__________ (S) Frank N. Wallace
State Entomologist of Indiana.

July 1, 1936 (S) Lee A. Strong
Chief, Bureau of Entomology and Plant Quarantine,
U. S. Dept. of Agriculture."

Table 118. -- Approximate Number of Men Working on the Several Programs by Months, Blister Rust Control, Indiana, 1934.

Program	Position	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Man-months
ERA	Temp. State Leader						1	1	1	1				4
	Laborers								5					[illegible]
	Sub-total						1	1	6	1				[illegible]
ECW Units	Laborers						11	35	14					[illegible]
All	Temp. State Leader						1	1	1	1				4
Programs	Laborers						15	36	21					[illegible]
	Total						[illegible]	[illegible]	[illegible]	1				[illegible]

Table 120. - Summary of Work Completed Showing Projects Grouped by Counties Illustrating Distribution, Indiana.

County	Project	Fine Acres and Pl. Site	Erad. Acres	Total No. Ribes	Total Cost	Cost Per Acre	Total For County	General Location in State
Brown	Bergman-Klem	16	953	4,092	$176.60	$0.47)	$191.30	South
	Gleason Estate	7	104	406	16.70	0.16)		-Central
Delaware	Drayo Estate	6	9	0	3.85	0.43	3.85	East - Central
Hancock	Falls Creek	6	50	1,125	49.30	0.82	49.30	East - Central
Huntington	Victory Knoll	3	5	0	2.65	0.88	2.65	North - East
Jennings	Crosley Estate	25	220	3,399	159.55	0.53		
	Selmier Estate	68	452.9	5,771	179.96	0.40	427.62	South - East
	Thompson Estate	35	140	969	56.70	0.40		
	Verbery Estate	$8\frac{1}{2}$	90	13	17.76	0.19		
Madison	Mounds Park	12	71	2,156	151.00	1.95	151.90	East - Central
Montgomery	H. Greendyke	11	20	3,545	38.25	1.91	38.25	West - Central
Porter	Shurr Bros.	10	82	2,319	49.60	0.60	49.60	North - West
Ripley	Hessner Estate	7	60	2,443	52.30	0.98	52.30	South - East
St. Joseph	Studebaker Co.	25	95	5,503	73.70	0.79	73.70	North - [illegible]
Steuben	Custell Farm	3	71	323	19.00	0.25	34.55	North -
	Pokagon Park	13	55	802	16.45	0.31		East
Tippecanoe	Gingrich Farm	$4\frac{1}{2}$	7	4	3.85	0.43	3.60	West - Central
Wabash	MacNamee Farm	7	50	0	2.50	0.04	2.50	North - East
White	Dimond Point	20	156	262	43.50	0.25	43.50	North - West

Under the original plan in 1935 considerable reconnaissance survey and local control work was accomplished by the State CCC [illegible].

Two thousand dollars of ERA funds were set aside in 1935 to carry on the work but none was used until 1936 when an agent was appointed on this ERA allotment. He was employed from early June until the 15th of September and with the exception of a few plantations in the most central portion of the state practically completed the task of giving initial protection to the important pine stands in the state. The work as organized and performed was done from ERA funds, State CCC and Forest CCC camps. Table 118 shows the personnel employed per month during 1936 in Indiana.

Local Control

During the 1936 season, 40,580 Ribes bushes were removed from 1,230 acres of land in giving protection to 760 acres of white pine and white pine planting sites in Indiana.

In Table 119 there is shown graphically the local control work performed during 1936. This table is segregated so that the work performed by the various agencies, ERA, State CCC and Forest CCC, is shown separately and collectively.

Table 120 groups 1936 local control work by counties, showing that the more important pine areas are located in [illegible] County which is in the southeastern part of the state and which lays due east of the new Federal Forest in Indiana.

In Table 121 local control for all work done since it was inaugurated in 1935 is shown.

Table 121. Summary by Years, Local Control, Indiana, 1935-36

Year	Acres Worked	Ribes pulled	Total Cost	Per Acre Cost	Per Acre Ribes	Cost Per Bush
1935	1,518	18,5[illegible]	552.[illegible]	.41	12.[illegible]	0.0[illegible]
1936	1,230	40,580	1,132.[illegible]	[illegible]	[illegible]	0.0[illegible]
Total	2,748	59,085	1,684.[illegible]	[illegible]	[illegible]	0.0[illegible]

Nursery Sanitation and Plant Quarantine Enforcement

No nursery sanitation work was done during the year and no cultivated black currants were destroyed unless they were located in the course of giving local control to pine areas.

Costs

In Table 122 costs of the 1936 work are tabulated according to the agency cooperating and phases of the project as funds obligated. It is noted

Table [illegible]. - State and Federal Expenditures for all Blister Rust Control Programs, Indiana During Calendar Year [illegible]

Agency	Expenditure classification	Supervision	B.P.I. agent activities	Field work: Ribes eradication	Field work: Pre-eradication survey	Field work: Scouting	Total
	Salaries	$75.00					$75.00
State	Expenses	1[illegible].00					1[illegible]
	Total	[illegible]					[illegible]
	Salaries		$1,2[illegible]	$601.16	$86.75	$140.16	[illegible]
BPI	Expenses		55.50	30.59	78.50	89.75	[illegible]
	Total		1,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
State	Salaries			264.16			[illegible]
ECW	Expenses			58.11			55.71
	Total			[illegible]			[illegible]
Parks	Salaries			150.20			[illegible]
ECW	Expenses			40.25			[illegible]
	Total			206.15			[illegible]
	Salaries	[illegible]	1,111.[illegible]	1,[illegible]	[illegible]	[illegible]	[illegible]
Total	Expenses	[illegible]	55.50	[illegible]	[illegible]	[illegible]	[illegible]
	Total	[illegible]	1,[illegible]	1,[illegible]	[illegible]	[illegible]	[illegible]

Table 123. - Percent of Expenditure Spent on Each Project, Indiana, 1934.

Agency	Supervision	B.R.C Agent Activities	Ribes Eradication	Pre-Eradication Survey	Checking	Total
State	100					100
E R A		65.6	13.2	7.4	13.4	100
State E C W			100			100
Parks E C W			100			100
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 124. - Percent of Activity Expenditures Spent by Each Agency, Indiana, 1934

Agency	Supervision	B.R.C Agent Activities	Ribes Eradication	Pre-Eradication Survey	Checking	Total
State	100					[illegible]
E R A		100	[illegible]	100	100	[illegible]
State E C W			50.8			[illegible]
Parks E C W			18.3			[illegible]
Total	100	100	100	100	100	[illegible]

that four agencies are involved. The State contribution is estimated at $210.00. This is for the estimated time of the State Entomologist, his assistant, his staff and for office space, etc.

The WPA (FERA) contribution paid the salary of the agent in charge at $125.00 per month plus his traveling expenses, for laborers on many of the smaller projects — paying them 50 cents per hour — and operating costs of the Government owned car that was in use in the state.

The State CCC and Park CCC supplied technical foremen for the work done by these agencies at $160.00 and $167.00 per month. Labor supplied by these agencies is charged on the basis of $1.00 per man day. Truck transportation for crew men is calculated on the basis of five cents per mile.

In Tables 123 and 124 these costs are converted so as to show percentage relationships.

Conclusion

With the exception of a few plantations in the central west portion of the state all areas of importance, as of 1934, have been given initial protection. It is likely that rust will soon be found in the northern tier of counties in the state and for that reason, within the next two or three seasons, a second eradication should be conducted at the Studebaker proving grounds and at Pokagon State Park.

BLISTER RUST CONTROL, OHIO, 1934

History of Work

Prior to 1916, blister rust had been found at two nurseries, the K. Haas Nursery at Akron on white pine imported from L. T. [illegible], Chatenay, France, in 1910; and the Storrs and Harrison Nursery, Painesville, on white pine imported from France in 1910 and 1911.

Diseased white pine had been shipped from J. Jenkins Nursery at Winona in the spring of 1911 to I. Hicks & Son, Westbury, Long Island, N. Y.

One infected pine was found in 1916 at the Storrs and Harrison Nursery, Painesville, from the same stock of pines imported from France. The entire pine stock was destroyed in 1916.

From 1917 to 1930 scouting work was conducted by Federal employees in cooperation with the State Nursery Inspection Service. Major emphasis was placed on inspection of planted white pine from infected nurseries. No rust was found except on two infected pines found in 1917 at a nursery near Cuyahoga Falls in Summit County. These were in a lot of 1,000 pines imported from a Minnesota nursery in 1916. This entire shipment was destroyed in 1917.

No further work was done until 1931 when Messrs. Sheals and Vilas made a short scouting trip to the northern portion of the state. They found blister rust on Ribes at four locations in the extreme northeastern corner of the state and one in the northwestern corner. At three of these locations infection was found on *Ribes nigrum* and two on *R. cynosbati*.

In 1933 the only work done was a two-day trip through Ohio made by Putnam principally for the purpose of interviewing officials regarding blister rust control work. No rust was found.

In 1934, mainly through a $12,500 NRA allotment and CCC labor from ECW Camp Robinson, considerable was accomplished in giving initial protection to native and planted white pine in Ohio. To protect 1,066 acres of white pine 706,101 Ribes bushes were removed from 12,982 acres of land.

Organization

Local control in Ohio started in 1933 with A. E. Vines directing or assisting in the work. In September 1933 Oscar J. Dodd was appointed State Leader on WPA funds and continued to direct ECW, CWA and ERA activities through 1934.

In the spring of 1934 a mobile crew of seven experienced men was formed, using ERA funds, to give initial protection to the more important scattered pine plantations of the state. This crew was very effective

and favorably received throughout the state. Some experimental chemical eradication was tried early in the spring but proved ineffective. Local control continued to be performed by CCC laborers from Camp Mohican during the eradication season.

Table 125 summarizes the personnel used on Blister Rust Control during 1936 in Ohio.

All work was, of course, conducted after a Memorandum of Understanding had been drawn up between the U. S. Department of Agriculture, Bureau of Plant Industry and the Ohio State Departments of Plant Industry and Forestry.

"MEMORANDUM OF UNDERSTANDING BETWEEN THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY, THE DEPARTMENT OF FORESTRY, OHIO AGRICULTURAL EXPERIMENT STATION, AND THE CHIEF OF THE DIVISION OF PLANT INDUSTRY, DEPARTMENT OF AGRICULTURE OF OHIO

Cooperative Work in Controlling White Pine Blister Rust in Ohio

"The object of the cooperative work outlined herein is to provide for scouting and inspection for the white pine blister rust in Ohio and for the application of such methods of eradication or control as may be necessary.

"A. The United States Department of Agriculture, Bureau of Plant Industry, Agrees:

(1) To pay the salaries and necessary travel expenses of one or more men for such time as may be necessary to determine the occurrence and limits of the spread of this disease in Ohio and under the authority of the Department of Forestry, Ohio Agricultural Experiment Station and/or the Chief of the Division of Plant Industry, Department of Agriculture of Ohio, cooperate in the eradication or control of the disease wherever found.

(2) To assume responsibility for technical instruction of employees engaged in these investigations and in blister rust eradication and control work.

(3) To conduct such experiments and demonstrations as may be desirable for the purpose of securing effective control of the white pine blister rust in Ohio.

"B. The Department of Forestry, Ohio Agricultural Experiment Station Agrees:

(1) To assume the administrative direction of the aforesaid employees of the United States Bureau of Plant Industry.

(2) To conduct such control activities as may be agreed upon each year by the cooperating parties.

(3) To prepare an Annual report of all blister rust control work

Table 156 - Approximate Number of Men Working on the Several Programs by Months, Blister Rust Control, Ohio, 1934

Program	Position	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Approx. No. Man-months
		No. Men Employed By Months-1934												
NRA	State Leader	1	1	1	1	1	1	1	1	1	1	1	1	12
	Foremen	1	1		1	1	1	1	1	1	1	1	1	11
	Laborer						5	5	4	4	1			19
	Sub-total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	7	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CWA	Foremen	4	4	4										12
	Sub-total	[illegible]	4	4										[illegible]
State-ECW	Foremen						1	2	2	1	1			7
	CCC Laborers						24	24	24	24	24			120
	Sub-total						[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
All Programs	State Leader	1	1	1	1	1	1	1	1	1	1	1	1	12
	Foremen	5	5	4	1	1	2	3	3	2	2	1	1	20
	Laborers						19	29	28	28	25			159
	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	31	[illegible]	[illegible]	[illegible]	[illegible]

performed under the provisions of this memorandum, one copy of which will be delivered to each of the cooperating parties.

(4) To submit in prescribed form to the United States Bureau of Plant Industry a monthly report of salaries and expenses paid by the State on blister rust control work.

(5) To have all salary and expense vouchers of temporary employees to be paid out of Federal funds approved by the individual directly in charge of supervising cooperative blister rust control work in the State before being submitted to the United States Bureau of Plant Industry for payment. This individual shall be under appointment as collaborator without compensation in the United States Department of Agriculture. All Federal funds expended in connection with this cooperative work shall be disbursed in accordance with the fiscal regulations of the United States Department of Agriculture.

"C. The Chief of the Division of Plant Industry, Department of Agriculture of Ohio Agrees:

(1) To cooperate in such survey and control activities in the [illegible] of commercial nurseries as may be necessary to the control of [illegible] disease in Ohio.

(2) To undertake such destruction of white pine or Ribes in Ohio and such enforcement of State laws as may be necessary for the effective prosecution of blister rust eradication and control work.

(3) To deputize and authorize the aforesaid employees of the United States Bureau of Plant Industry to destroy such pines, currants and gooseberries as may be necessary and as provided for by State laws.

"D. It is Mutually Agreed:

(1) That the details of this cooperative work shall be planned and executed jointly by the Bureau of Plant Industry through its Division of Blister Rust Control, the Department of Forestry, Ohio Agricultural Experiment Station, and the Chief of the Division of Plant Industry, Department of Agriculture of Ohio.

(2) That this memorandum of understanding shall take effect July 1, 1938, and continue in effect until June 30, 1939, provided that any one of the parties may terminate the agreement at any time by a written statement to that effect 30 days in advance of the date of termination desired.

(3) That all persons appointed by the United States Bureau of Plant Industry and its cooperators under this memorandum shall be satisfactory to the cooperating parties.

(4) That the results of the cooperative work may be published [illegible] or upon mutual agreement, by any one of the cooperating parties, with due credit given to the cooperating agencies. All manuscripts therefore shall be criticised by the cooperating parties before publication and, all form letters, bulletins and any other circulars to be mailed in penalty envelopes shall be submitted in manuscript form for approval by the United States Department of Agriculture before being printed or sent out, in accordance with Postal Law.

(5) That any expenditures involved in the work herein assumed by the United States Bureau of Plant Industry are contingent upon appropriations made by Congress for continuance of these activities, but no Federal funds shall be expended in compensation for host plants destroyed in control work.

(6) That for the fiscal year July 1, 1935, to June 30, 1936, the Department of Forestry, Ohio Agricultural Experiment Station and its cooperators will expend about $2,000 and the Federal Government in behalf of the United States Bureau of Plant Industry about $15,000 in connection with the work herein provided for, provided, however, that the maximum expended by the Federal Government shall not exceed $25,000.

"In witness whereof the parties hereto have severally signed these presents on the respective days and dates hereinafter set forth.

Date

Sept. 18, 1935 — (S) Edmund Secrest
State Forester, Department of Forestry, Ohio Agricultural Experiment Station.

Oct. 5, 1935 — (S) W. G. Ellenwood
Chief, Division of Plant Industry, Department of Agriculture of Ohio

Oct. 18, 1935 — (S) W. A. Taylor
Chief, Bureau of Plant Industry, U. S. Department of Agriculture"

"AMENDMENT TO MEMORANDUM OF UNDERSTANDING   Amendment No. [illegible]
Effective July 1, 1933
between
THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE, THE DEPARTMENT OF FORESTRY, OHIO AGRICULTURAL EXPERIMENT STATION, AND THE CHIEF OF THE DIVISION OF PLANT INDUSTRY, DEPARTMENT OF AGRICULTURE OF OHIO.

Cooperative Work in Controlling White Pine Blister Rust in Ohio

"Whereas,

The said cooperative work in controlling white pine blister rust in Ohio has, by reorganization within the Department of Agriculture, been transferred to the Bureau of Entomology of said Department;

Now, therefore, in accordance with the foregoing provision and pursuant to such reorganization, it is mutually agreed that paragraphs D-2 and D-6 of the Memorandum of Understanding described above shall be amended as follows:

D-2. That this memorandum of understanding shall continue in effect until June 30, 1935, provided, that any one of the parties may terminate the agreement at any time by a written statement to that effect 30 days in advance of the date of termination desired.

D-6. That for the fiscal year July 1, 1934, to June 30, 1935 the Department of Forestry, Ohio Agricultural Experiment Station and its cooperators will expend about $1700.00 and the Federal Government in behalf of the United States Bureau of Entomology about $5,100 in connection with the work herein provided for, provided, however, that the maximum expended by the Federal Government shall not exceed $5,[illegible]

June 18, 1934 — (S) Edmund Secrest
State Forester, Department of Forestry, Ohio Agr. Exp. Station

July 17, 1934 — (S) F. N. Ellenwood
Chief, Division of Plant Industry, Dept. of Agric. [illegible]

Aug. 6, 1934 — (S) Lee A. Strong
Chief, Bureau of Entomology and Plant Quarantine
United States Department of Agriculture

Approved: C. G. Williams, Director.

Status of the Rust

Blister rust on white pine was found at the Burke Estate in Chagrin Falls, Geauga County, in 1934. This marks the first time naturally introduced rust has been found in the state. Infection on cultivated black currants was also found in Ashtabula, Lake, Geauga and Cuyahoga Counties. This, together with earlier found Ribes infection, is tabulated in Table 126. Augmenting this information, Table 127 gives further details regarding all infections discovered in the state with the early history of each infection and in many cases the ultimate destruction record of the diseased host.

Distribution of White Pine in Ohio

White pine originally was native throughout Northeastern Ohio and it is still found there in scattered lots. Today there are four major areas of native pine in the state in addition to the many scattered planted areas. The natural pine areas are: The Little Mountain Area of Lake and Geauga Counties, The Little Beaver River stands, The Mohican River stands of [illegible] acres and the Vermilion River Area. These stands are usually scattered along stream banks and have escaped heavy fires and clearings for farms. It is now interesting to note that white pine is rapidly reclaiming old fields and is especially reseeding in forested areas where chestnut is being eliminated by blight. With great strides being made to control blister rust it is evident that a great future is in store for white pine in reclaiming old fields where seed trees are near and as the likely tree for general reforestation purposes.

Interest in white pine planting has grown since 1908 when the Ohio Agricultural Experiment Station forest nursery began to supply trees for forest plantings. From 1908 to 1932, inclusive, 842 plantings and [illegible] white pine trees were planted. In 1932 20 percent of the planting stock used on state forests was white pine. Other percentages were short leaf pine, 37 percent; hemlock, 16 percent; red pine, 8 percent; Scotch pine, [illegible]; tulip, 7 percent and all others, 4 percent.

Pre-eradication Surveys

Exact locations of pine plantations and native pine stands were made through CWA and FERA pre-eradication surveys conducted during the winter months of 1933-34. The native pine stands had been practically all mapped during the preceding year. 'Leads' on white pine plantation locations were secured from the records of the State Forestry Department, from whom the plantation stock had been secured. These 'leads' were followed and through local Post Office authorities the approximate locations were realized.

In Table 128 there is shown the results of the 1934 pre-eradication survey program to locate native white pine stands while in the lower part of the same table there is shown a compilation of the survey to locate plantations that have been found sufficiently large and important enough to be protected.

Table 126. - Showing Status of Present Infection in Ohio Counties, Classified According to Year of Infection First Noted

Year 1st Found on Ribes	County	Ribes Infection Only	Ribes and Pine Infection with Date of P. Infection Discovery 1910	1911	1931	1934	Total [illegible]
	Summit*		X				
	Lake*		X				
	Mahoning†			X			
	Columbiana*			X			[illegible]
1931	Ashtabula	X					
	Fulton	X					
	Geauga					X	[illegible]
1932	Cuyahoga	X					[illegible]
Total	8	3	2	2		1	[illegible]

Table 157. - List of Blister Rust Locations Found or Originating in Ohio, 1910 to 1934.

Location	County		Host Infected	Year Found	Remarks
E. Huss nursery, Akron	Summit		White Pines	1910	Pines imported from [illegible], France.
Storrs & Harrison nursery, Painesville	Lake		do	1910 1911 1916	10,000 pines imported from Orleans, France, in 1909. Infected pine in 1916 was from same lot as those found infected in 1910 and 1911. No Ribes infection seen. Remainder of pine lot destroyed Dec. 1916.
J. Jenkins nursery	Columbiana		do	1921	Diseased pines shipped from Jenkins nursery in 1921 to S. Hicks & Son, L.I., N.Y. Infection discovered at destination.
Nursery near Cuyahoga Falls	Summit		Two small white pines	1919	1,000 white pines imported from a Minnesota nursery in 1915. All remaining white pine (862) of this lot were destroyed in 1919. No Ribes infection found.
One mile east of Williamsfield along road	Ashtabula		1 R. [illegible] heavily infected	6/5/21	Found by [illegible] and Pierce [illegible] stage. [illegible] R. [illegible] [illegible]
Mr. Kelly, Monroe Center	do		R. [illegible] one bush	5/5/31	These two places found by [illegible] about 1/8 mile apart. [illegible] R. cynosbati [illegible]. [illegible] found infected.
I. D. Anderson, Monroe Center	do		R. nigrum natural bushes	6/5/31	
[illegible]	[illegible]		R. [illegible] one bush	[illegible]	[illegible]
[illegible]	[illegible]		R. [illegible]	[illegible]	[illegible]
[illegible]	[illegible]		R. [illegible]	[illegible]	[illegible]
[illegible]	do		[illegible]	[illegible]	[illegible]
[illegible], Jefferson	do		do	1934	Heavy infection.
A. D. [illegible], Painesville	do		do	1934	Heavy infection.
F. M. [illegible], [illegible]	Lake	8	do	1934	Heavy infection.
T. S. [illegible], [illegible] Hill	do	30	do	1934	Heavy infection.
Arthur [illegible], Little Mountain	do	10	do	1934	Medium infection.
[illegible] Farm, Chardon	do	75	do	1934	Heavy infection.
Circle K Farms, Gates Mill	Geauga	20	do	1934	Heavy infection.
A. [illegible], Gates Mill	do	10	do	1934	Heavy infection.
Berkshire Farms, Little Mountain	do	12	do	1934	Heavy infection.
[illegible] Estate, Little Mountain	do	15	do	1934	Heavy infection.
Peter Peterson, Jr., Chesterland	do	10	do	1934	Heavy infection.
S. F. Dolloway, Chagrin Falls	do	40	do	1934	Medium infection.
H. B. [illegible] Estate, Chagrin Falls	do	30	do	1934	Bushes pulled, heavy infection.
[illegible], Novelty	Cuyahoga		Some to be pulled	1934	Heavy infection.
[illegible] Estate, Chagrin Falls	do		do	1934	Heavy infection.
[illegible] Estate, Chagrin Falls	do	10	R. nigrum	1934	Heavy infection.
[illegible]			do	1934	Light infection.

Table 136. - Pre-Eradication Survey of Native & Planted White Pine, Ohio, -- 1961.

Native White Pine

County	Number Areas	Acres W. P. to Be Protected	Acres to be Worked by Crew	Acres to be Worked by Scout	Acres to be Worked by Total	Man - Days Labor Required Crew	Man - Days Labor Required Scout	Man - Days Labor Required Total
Lake	4	310	905	975	1,880	526	16	542
Geauga	6	780	663	517	1,180	856	11	866
Cuyahoga	1	5	100	90	190	48	3	46
Lorain	3	71	755	580	1,140	199	2	158
Erie	1	10	85	-	85	25	-	26
Ashland	2	946	1,580	1,050	2,930	78	19	97
Summit	1	10	-	115	115	-	8	5
Columbiana	1	80	160	210	370	9	4	9
Knox	1	542	110	1,409	1,519	14	45	102
Licking	1	80	-	166	166	-	5	5
Belmont	1	30	78	119	192	12	10	45
Monroe	1	50	85	160	145	85	18	45
Holmes	8	271	108	1,088	1,187	32	96	104
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	274	[illegible]

White Pine Plantations

County	Number Areas	Acres W. P. to Be Protected	Acres to be Worked by Crew	Acres to be Worked by Scout	Acres to be Worked by Total	Man - Days Labor Required Crew	Man - Days Labor Required Scout	Man - Days Labor Required Total
Ten Counties	70	594	478	9,995	10,473	572	104	605
Grand Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Local Control

Local control was conducted under three programs during 19[illegible]. The results of these programs are discussed separately; the CWA local control work was conducted during the latter part of March as an experiment in dormant eradication. One State owned planting and one privately owned planting were completed in Southern Ohio. Work in the Spellacy section of the Mohican River Area was not completed so no pine was protected by CWA local control in this section. Later the section was completed by the WPA program and the acreage of white pine protected included on the WPA project. The results of the CWA local control are shown in Table [illegible] In general it was found that dormant eradication is not practical and effective.

ECW

The ECW local control work was carried on to protect native white pine on private land in Ashland County. Four acres of white pine plantation are included in the acreage of native pine. No work was on State land [illegible] of the private land worked is in the Mohican State Park purchase [illegible]

The Hopewell, Hall School, Stevenson, Pine Run and Spellacy areas were given initial protection during 1934. These results are given in Table [illegible]

WPA

The WPA local control projects were in native and planted [illegible] on both State and privately owned land in 28 different counties. This work is summarized in Table 129.

In Table 130 there is shown all work performed since initial eradication was started in 1933.

Analysis of Ribes Eradication by Ribes Types

As considered in the general section of this report there are [illegible] Ribes types in each of which the Ribes abundance varies within relatively narrow limits. In Ohio there has been one type dropped and one type substituted. In Ohio, in this work Type B, Tamarack Swamp, has not been encountered and it is felt that for the state a type should be substituted that would embrace abandoned fields that are regenerating to forest [illegible] A considerable amount of all work (15.6%) in the state was performed on abandoned fields. For this reason, Type "B" was set up. The six general Ribes types are as follows:

A - Swamp Type - Alder swamp, cedar swamp, spruce-tamarack swamp, etc. Ribes usually abundant, especially wild black currant.

B - Abandoned Fields - Regenerating to briars scattered [illegible] the usual forest old field regeneration flora.

C - Upland Hardwoods - Beech-maple, oak-hickory. Ribes usually numerous.

Table [illegible]. - [illegible], 1934

Program	No. Projects	Acres Pine Released	Acres Worked: Crew	Acres Worked: Scout	Acres Worked: Total	Trees Pulled: Crew	Trees Pulled: Scout	Trees Pulled: Total
NRA	70	742	1,989	7,958	[illegible]	89,998	[illegible]	[illegible]
State-[illegible]	8	212	[illegible]	[illegible]	[illegible]	104,820	4,094	[illegible]
[illegible]	1	12	466	—	[illegible]	1,415	—	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

Program	Costs: [illegible]	Costs: Labor	Costs: Sup.	Costs: Supplies & Transportation	Total Costs	Man-days	Per Acre: Cost	Per Acre: Trees
NRA	[illegible]	[illegible]	904.00	[illegible]	[illegible]	.06	.50	12
State-[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.78	[illegible]	26
[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	.67	[illegible]	2
Total	[illegible]	[illegible]			[illegible]			

Table [illegible]. - [illegible] 1933 to 1934, [illegible]

Year	Acres Pine Protected	Acres [illegible]: Crew	Acres [illegible]: Scout	[illegible]	Trees Pulled: Scout	Trees Pulled: Total	Total Cost	Per Acre: Cost	Per Acre: Trees	Cost Per Day
1933	[illegible]	1,104	[illegible]	[illegible]	[illegible]	91,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1934	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			

D – Pine – Scattered native pine soil usually sandy loam [illegible] [illegible] than found in Type C.

E – Pasture – Grazed lands. Ribes varying with topography, degree of grazing and type of domestic animal.

F – Cultivated – Ribes only except along fence rows.

The Ohio eradication job reports for 1936 have been broken down by acres worked, Ribes pulled and man days by the different Ribes types. This was done separately for each of the two agencies performing the work and for the combined work of the two agencies (ECW and ERA). So little work was performed by the CWA dormant eradication crew that the results do not yield to this analysis. The analysis referred to is shown in Table 151. From Table 151 it is interesting to note the greater accomplishment of the ERA work over that of ECW. Although the ERA crews put in longer hours per day, it is doubtful if the extra time would begin to explain why the ERA crews pulled five times as many bushes per man day as did the ECW crews, especially when the bushes were almost four times as thick on ECW areas as on ERA. The outstanding point is that, in practically every detail in which the work is compared, the ECW results fall far short of those of the ERA program. However, the ECW work was done where the topography was very rough, making the going much more difficult than that of the E R A crews.

It is noticed that this analysis follows trends that were also noticeable in the analyses in the other states. Ribes for instance are much heavier in Swamp Type A than in any other type with Upland Hardwood following. In Ohio only 1.1 percent of all areas worked was swamp type yet this 1.1 percent of area yielded 18.6 percent of the total bushes pulled. It is interesting to note too that in heavier Ribes concentrations the crews are correspondingly more speedy in pulling bushes. For example in considering all work results, crews pulled 702.2 bushes per man day in the swamp type whereas the next nearest speed was attained in the Pine type where 184.7 bushes per man day were pulled.

Checking

In Ohio, as in all other states of the region, careful and systematic checks are made to see that worked areas meet the 25 FLR requirement. Results of the many checks are shown in Table 152.

Nursery Sanitation

Nursery sanitation consists of the work involved in the establishment and maintenance of Ribes free zones around white pine producing nurseries. The work is conducted in cooperation with the State Nursery Inspection Service and the nurserymen.

During April, the Ohio State Leader assisted Mr. E. A. [illegible], Associate Plant Quarantine Inspector of the Division of Domestic Plant Quarantines and Mr. L. N. Hodgkins of the Washington office in checking the eradication work in the 1500 foot zone about the State Forest Nursery.

Table 131. - Analysis of Ribes Eradication by Ribes Types, Ohio, 193[illegible]

R. Type	Number: Acres Worked	Number: Ribes Pulled	Number: Total Man-Days	Percent of Total: Acres Worked	Percent of Total: Ribes Pulled	Percent of Total: Man-Days	Ave. per A.: Ribes	Ave. per A.: Man-Days	R. Pulled per Man-Day
				State ECW					
B	870	9,350	349	17.7	5.0	7.0	11	0.32	[illegible]
C	1,509	95,875	4,257	50.6	93.0	87.0	55	1.28	[illegible]
D	4	2	1	.1	Trace	Trace	1	0.25	[illegible]
E	399	1,645	84	13.1	1.5	3.0	4	0.16	[illegible]
F	470	427	84	15.6	.6	3.0	1	0.16	[illegible]
Total	[illegible]	[illegible]	[illegible]	100	100	101	35	[illegible]	[illegible]
				ERA					
A	128	37,981	54	1.5	38.4	15.9	295	0.43	[illegible]
B	1,478	376	5	18.1	.5	1.2	Trace	Trace	[illegible]
C	3,213	45,954	981	39.5	60.0	67.3	12	0.27	[illegible]
D	718	8,201	86	7.5	8.5	12.4	11	0.07	[illegible]
E	1,185	2,288	16	17.8	2.7	3.5	2	0.01	[illegible]
F	2,420	1,119	9	24.9	.7	2.4	Trace	0.01	[illegible]
Total	[illegible]	[illegible]	[illegible]	100	100	100	10	[illegible]	[illegible]
				ECW & ERA					
A	125	39,481	54	1.1	13.6	2.1	290	0.42	[illegible]
B	1,948	5,888	154	15.7	2.7	6.6	7	0.26	[illegible]
C	6,285	147,839	3,128	48.4	72.1	82.6	38	0.40	[illegible]
D	788	6,503	53	5.7	4.0	2.1	11	0.07	[illegible]
E	1,586	3,920	80	12.4	1.9	3.1	2	0.05	[illegible]
F	2,881	1,246	75	22.7	.6	2.2	1	0.03	[illegible]
Total	[illegible]	[illegible]	[illegible]	100	100	100	16	[illegible]	[illegible]

at Marietta and the Jenkins Nursery at Kinsman. The Sheets [illegible] nursery sanitation project at Painesville was dropped because of [illegible] prices asked by neighbors for their cultivated bushes.

The Bohlender Nursery at Tippecanoe City was protected in [illegible] and is ready for inspection in the spring of 1935.

The State Forest Nursery at Wooster was partially completed except for a few cultivated bushes which have not yet been removed. Permission to move them within a year has been granted by the owners.

Maps of these nurseries were prepared for the Chief of the Division of Plant Industry so that the State of Ohio can establish quarantine zones about each nursery that has qualified for a Federal white pine shipping permit.

The summary of all 1934 nursery sanitation work is shown in Table 153.

Nursery sanitation work done during 1933 and 1934 is tabulated in Table 154.

Costs

In Table 155 are shown the total costs of the control program in 1934 in Ohio. In this table the program is broken into the various phases of the program and charges entered against each activity according to the agency participating.

In Table 156 there is shown the contents of the preceding table except that the financial contributions have been expressed in percent in relation to the total expenditure for each agency. Table 157 shows the same contributions but expressed in percent with relation to the total of the expenditure given to each phase of the control program.

Conclusion

During the past two years [illegible] acres of white pine, or [illegible] percent of all the white pine in Ohio, have been given initial protection from white pine blister rust.

Practically all white pine in the state has been mapped. Information is now available concerning the amount of work needed to protect the [illegible]. A large proportion of the area in Southern Ohio is ribes free and there is practically no white pine in Western Ohio so that most of the blister rust control work is now confined to the eastern part of the state. The establishment of this fact aids materially in limiting the size of the control program.

Blister rust infection on white pine was found for the first time in Ohio during 1934. Infected black currants were found near a white pine in Northern Ohio where 10 white pine nurseries and considerable native and planted white pine are found. Control activities are particularly needed in this area.

Table 135. - State and Federal Expenditures for All Blister Rust Control Projects, [illegible] 1938.

Funds	Classification	Supervision	Agent Activity	Ribes Eradication	Nursery Sanitation	Pre-eradication Survey	Checking	Other Field Data	Equipment	Total
State	Salaries	$530.00	-	81.00	145.40	-	-	-	-	[illegible]
	Expense	480.00	-	-	-	-	-	-	60.00	540.00
	Total	1,010.00		81.00	14[illegible].40				[illegible]	[illegible]
ERA	Salaries	1,088.76	1,105.87	1,836.21	155.85	216.95	65.41	23.36	-	4,198.43
	Expense	335.13	42.29	585.08	117.59	492.45	57.08	68.35	518.89	2,199.98
	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CWA	Salaries	-	136.48	514.27	36.00	1,262.01	-	-	-	1,948.80
	Expense	-	-	-	-	-	-	-	-	-
	Total		136.48	514.37	36.00	[illegible]				[illegible]
ECW	Salaries	-	87.12	6,688.15	159.00	-	-	-	-	6,934.27
	Expense	-	-	-	-	-	-	-	-	-
	Total		[illegible]	[illegible]	159.00					[illegible]
TOTALS	Salaries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	65.41	[illegible]	-	[illegible]
	Expense	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 136. - Percent of Each Agency Expenditure Spent on Each Project, Ohio, 1934

Agency	Super-vision	B.R.C. agent activities	Ribes eradi-cation	Nursery sanita-tion	Pre-erad-ication survey	Checking	Other field data	Equipment & misc.	Total
State	81.6		1.7	11.9				4.8	100
NRA	21.3	17.9	32.2	4.3	10.0	1.9	2.7	9.7	100
CWA		7.0	11.0	1.8	80.2				100
ECW		1.3	96.4	2.3					100
Total	14.4	8.3	54.5	3.7	13.3	0.7	1.0	4.1	100

Table 137. - Percent of Each Project Expenditure Spent by Each Agency, Ohio, 1934

Agency	Super-vision	B.R.C. agent activities	Ribes eradi-cation	Nursery sanita-tion	Pre-erad-ication survey	Checking	Other field data	Equipment & misc.	Total
State	42.6		0.3	23.8				8.9	7.5
NRA	57.4	83.7	22.9	44.4	29.1	100	100	91.1	38.7
CWA		9.9	2.4	5.9	70.9				11.8
ECW		6.4	74.4	25.9					42.0
Total	100	100	100	100	100	100	100	100	100

Five nursery sanitation projects were carried on during the year. Three of these were completed.

Costs of Ribes eradication were materially lowered by the pre-eradication survey and by the use of a mobile scout-crew instead of common labor.

Excellent cooperation in the blister rust program has been given by owners, pine nurseries, state officials and all those assisting in the work. The program has been supported by ECW, NRA, CWA and State contributions.

moore